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Building 419 Closure Report - May 2013

M. Abri

May 30, 2013

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LLNL-TR-637892

Abri Environmental Engineering, Inc.

Environmental Management and Compliance Consultants

Closure Report and Certification for the Building 419 Hazardous Waste Treatment Handling Facility

May 2013

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

CLOSURE REPORT AND CERTIFICATION FOR BUILDING 419 HAZARDOUS WASTE FACILITY HANDLING FACILITY

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CLOSURE REPORT FOR BUILDING 419 TREATMENT FACILITY

Executive Summary

The purpose of this closure report and certification is to meet the requirements of Section 66265.115 of Title 22 California Code of Regulations (CCR) for final closure of the Building 419 Treatment Facility (B419). B419 is located at the Livermore site of Lawrence Livermore National Laboratory (LLNL).

LLNL is owned by the U.S. Department of Energy (DOE) and operated jointly by DOE and Lawrence Livermore National Security, LLC (LLNS). LLNL received its permit to operate hazardous waste facilities from DTSC in 1999. As a condition of the permit to operate, LLNL was required to submit a closure plan for B419. Abri Environmental Engineering, Inc. was retained by LLNL to observe the B419 closure process and prepare this closure report and certification.

B419 was constructed in the late 1940s by the U.S. Navy for operations related to airplane maintenance. LLNL used the facility as an assay laboratory, and between 1975 and 1989, for equipment decontamination and hazardous and mixed waste size reduction and solidification activities. Prior to closure, the configuration of the B419 Treatment Facility consisted of a structure and yard areas. The 7860-square-foot structure consisted of three areas, which included hazardous waste management facilities, utility rooms, and an office area. Hazardous waste management areas consisted of rooms 124, 155 and 167. The yards were open areas on the north and west side of the building structure, and were used as staging and Waste Accumulation Areas. Two 500-gallon underground, 90-day retention tanks and associated piping were located in the west yard.

To date the following activities have been completed:

- All of the B419 structures, including the tank vault in the west yard, have been demolished,
- Sampling and analysis have taken place,
- The waste that was generated as a result of the closure activities has been disposed, or is stored at Decontamination and Waste Treatment Facility (DWTF), a permitted hazardous waste facility, and
- The site has been graded and paved.

As a result of the sampling and analysis process, contamination was found at B419. The results for the concrete and structural samples have been used for characterization of the wastes for disposal purposes. Wastes generated as a result of the building demolition and soil excavation have been disposed as low-level Radioactive and mixed waste as appropriate. Soil contamination was found and has been removed in accordance with the closure plan requirements and as directed by the DTSC. Results of soil analytical tests have been used to characterize the site, conduct fate and transport modeling and conduct a risk assessment.

The entire LLNL Livermore site is a CERCLA site; however, soil contamination above the clean closure standards that was found during the 2011 sampling campaign was removed, except for polychlorinated biphenyl found at the tank vault location in the west yard. Clean closure standards consisted of the Regional Screening Levels (RSLs) for residential areas, published by the U.S. Environmental Protection Agency (EPA), Region 9, subject to the limitations stated in DTSC Human Health Risk Assessment (HHRA) Note 3, regional backgrounds developed by San Francisco Regional Water Quality Control Board, California Human Health Screening levels (CHHSL), DOE orders, and LLNL site background.

Fate and transport modeling conducted by LLNL shows that the remaining contamination will not impact groundwater for hundreds of years (see **Appendix L**). Risk assessment conducted by LLNL for the remaining PCB contamination did not warrant further action; see Section 6.5 for more information. LLNL is seeking DTSC concurrence that based on modeling and risk assessment that remaining levels of containments are acceptable to leave in place.

CLOSURE REPORT AND CERTIFICATION FOR BUILDING 419 TREATMENT FACILITY

1.0 Introduction

1.1 Purpose

The purpose of this closure report and certification is to document the closure activities conducted at the Building 419 Treatment and Storage Facility (B419) at the Livermore site of Lawrence Livermore National Laboratory (LLNL), and to meet the requirements of Title 22 CCR, Section 66265.115.

Abri Environmental Engineering, Inc. was retained by LLNL to observe the B419 closure process and prepare this closure report and certification. As required by the regulations and as stated in Department of Toxic Substances Control (DTSC) guidance documents, this report contains the following:

- Supervisory personnel description (Section 1.3)
- Modification and amendments to closure plan (Section 1.4)
- Summary of closure activities (Section 4 and 6)
- Sampling results (Section 5 and 6.3)
- Data analysis (Section 5 and 6.4)
- Shipping documents showing disposition of waste inventory (**Appendix T**)
- Photographs

1.2 Background

LLNL is owned by the U.S. Department of Energy (DOE) and operated jointly by DOE and Lawrence Livermore National Security, LLC (LLNS). The U.S. Environmental Protection Agency (EPA) identification number for LLNL Livermore site is CA 2890012584.

LLNL received a permit to operate its hazardous waste facilities at its Livermore site in November 1999 (LLNL, 1999). B419 was not permitted under the permit to operate and remained an interim status facility.

The Final Closure Plan for Building 419 was submitted in May 2000 to DTSC in compliance with the Special Condition as outlined in Part IV, Item Number 4, of the LLNL Hazardous Waste Facility permit (DTSC, 1999). The Final Closure Plan for Building 419 was approved in October 2009.

1.3 Description of Supervisory Personnel

Abri Environmental Engineering, Inc. was hired to monitor the closure activities. A field engineer was present at the site to observe the closure activities. Abri Engineering also provided the independent qualified registered professional engineer certification. Mr. William W. Moore, a

California-licensed civil engineer (P.E.), supervised the process and provided the certification for the report.

The LLNL project management team included the following:

- The Project Manager who, as the responsible individual, had overall responsibility for the project.
- The Environmental Manager responsible for compliance with the approved Closure Plan and the point of contact for the DTSC.
- LLNL's ES&H Team Leader responsible for reviewing and approving health and safety plans, and integration of Environmental, Safety and Health (ES&H) resources.
- The Project Industrial Safety Engineer responsible for defining the controls necessary, including personnel protective equipment (PPE), ergonomic safety, Occupational Safety and Health Administration (OSHA) compliance, electrical safety, traffic safety, and fall protection.
- A LLNL Project Health Physicist responsible for health physics issues, including PPE, monitoring, etc.
- A Fire Safety Engineer responsible for fire safety issues and implementation of necessary controls.
- An Environmental Analyst responsible for waste characterization and regulatory issues.
- A Waste Manager responsible for management of generated waste.
- An ES&H Team Technician responsible for overall ES&H controls implementation at the site.

LLNL employees implemented the approved final closure plan. Other organizations involved in the closure activities were as follows:

- **Weiss Associates:**

  The Weiss Associates team was responsible for collecting samples, and ensuring the quality assurance/quality control (QA/QC) processes were followed.

- **Gregg Drilling:**

  The Gregg drilling team was responsible for collecting soil and groundwater, as appropriate, for samples.

- **Australian Laboratory Services Environmental Services, Fort Collins, CO, (ALS—FC) Laboratory:**

  ALS--FC was responsible for analyzing the samples and verification processes. ALS--FC possesses California state certification for the project-pertinent EPA methods.

- **BC Laboratory**

  BC Laboratory analyzed the groundwater samples for hexavalent chromium. BC Laboratory possesses California state certification for the pertinent EPA method.

- **LLNL Radioactive and Hazardous Waste Management Program (RHWM)**

  Hazardous, mixed, and low-level radioactive wastes and nonhazardous liquid wastes were processed through LLNL Radioactive and Hazardous Waste Management Program and handled on site at Waste Accumulation Areas (WAA), the DWTF and/or shipped off site as appropriate.

1.4 Modifications and Amendments to the Approved Closure Plan

As described below, unexpected field conditions, and other considerations dictated changing some parameters of the approved closure plan. LLNL adhered to prescribed processes to notify the DTSC of the changes.

1.4.1 Closure Timeline Delay

The approved final closure plan included a 21-month closure timeline. Based on the 21-month closure timeline, the completion date for the closure activities was scheduled for July 2011. LLNL informed the DTSC of the delay due to funding issues in a letter dated April 27, 2011. The DTSC acknowledged the receipt of the information in a letter dated July 7, 2011 (See **Appendix A)**.

1.4.2 Concrete, Asphalt, Soil Sample Changes

Field conditions necessitated changing the following sampling locations:

- Concrete, Asphalt and Soil (CAS) #10 and #11 were inadvertently moved approximately 10 ft. to the south.
- CAS #14 was moved 3 ft. to the east at 5 ft. depth due to discovery of a second concrete pad at 4.5 ft. depth.
- CAS #15 was moved 14 in. to the south for resampling due to elevated temperature of the sample as they arrived at the laboratory.
- CAS #16 was moved 10 in. to the south for resampling due to elevated temperature of the samples as they arrived at the laboratory.
- CAS #17 was moved 3 ft. to the north and 4 ft. to the west due to discovery of a second concrete pad at 4.5 ft. depth
- CAS #18 was moved 1 ft. to the north due to proximity to utility lines.
- CAS #21 was moved .5 ft. to the east due to existence of a floor drain.
- CAS #23 and #33 soil surface samples were not collected due to inadequate soil volume; a second concrete pad was discovered below the concrete floor.
- CAS #24 was taken in the middle of the vault sump due to inability to obtain enough soil at 2 ft. depth. Since the vault floor sloped to the sump, this was a better location for a sample.
- CAS #25 was moved 2 ft. to the east and 4 ft. to the south due to proximity to sanitary sewer line.

- CAS #28 was moved 3 ft. to the west due to proximity to sanitary sewer line.
- CAS #29 was moved 1 ft. north due to proximity to utility lines.
- CAS #30 was collected at 6.5 ft. instead of 16.5 ft. from the tank vault. 16.5 ft. was a typo.
- CAS #32 was moved 3 ft. to the north due to inability to get enough soil at 2 ft. depth.
- CAS #35 was moved 2.5 ft. to the south and 2 ft. to the west due to proximity to sanitary sewer line.
- CAS #36 was moved 10 in. to the south for resampling due to elevated temperature of the sample as they arrived at the laboratory.
- CAS #38 at 10 ft. depth triggered the requirements for analyzing TCLP and STLC; however, only TCLP analysis was performed due to inadequate volume of soil sample.

1.4.3 Concrete Floor sample changes

The approved closure plan indicated sampling and analysis of concrete floors based on prescribed locations. As a cost saving measure and a way to meet the requirements of the disposal facility, LLNL suggested compositing samples, in a letter dated June 28, 2011 (see **Appendix B**). The DTSC approved the approach in a letter dated July 7, 2011 (see **Appendix A**).

1.4.4 DTSC Violations

As a result of a Compliance Evaluation Inspection conducted by the DTSC on April 28, and May 2, 2011, LLNL received two "Major" and one "Non-Minor" violation of hazardous waste regulations while conducting the closure activities. The DTSC inspection reports states the violations as follows:

1- On or about June 28, 2011, LLNL violated Title 22, California Code of Regulations, section 66265.51(b) because it failed to implement provisions of its contingency plan for an unplanned release of storm water into the storm drain at the Building 419 closure site area.

2- On or about December 2010, and January 2011, LLNL violated California Health and Safety Code, section 25160(b)(3) since it did not include information on manifest records revealing that hazardous waste from Building 419 was transported by rail.

3- On or about December 2010 through January 2011, LLNL violated California Health and Safety Code section 25163(a)(1) since it transferred custody of a hazardous waste to a transporter who does not hold valid registration issued by DTSC.

LLNL provided formal responses to the three violations. See **Appendix C** for a copy of DTSC violation reports and LLNL responses.

1.4.5 Notification of DTSC

As stated in Section 1.2 of the approved closure plan (LLNL, 2004), LLNL followed the appropriate processes to amend the closure plan after closure activities began by notifying the DTSC and by amending the document. Correspondence amending the approved closure plan has been included in this report as appropriate.

2.0 Facility Information

EPA Identification Number:	CA2890012584
Name:	Lawrence Livermore National Laboratory
Location:	7000 East Avenue Livermore, Livermore, California
Mailing Address:	Lawrence Livermore National Laboratory P.O. Box 808, Livermore, CA 94551
Facility Operator 1:	Lawrence Livermore National Security, LLC
Facility Operator 2:	U.S. Department of Energy
Facility Owner:	U.S. Department of Energy
Facility Contact Person and Title:	Thomas T. Kato Environmental Functional Area Manager

LLNL is owned by the DOE and is jointly operated by the Lawrence Livermore National Security, LLC. and DOE. The LLNL Livermore Site is an approximately 821-acre facility located in the city of Livermore in the County of Alameda, California, (see **Figure 2-1**).

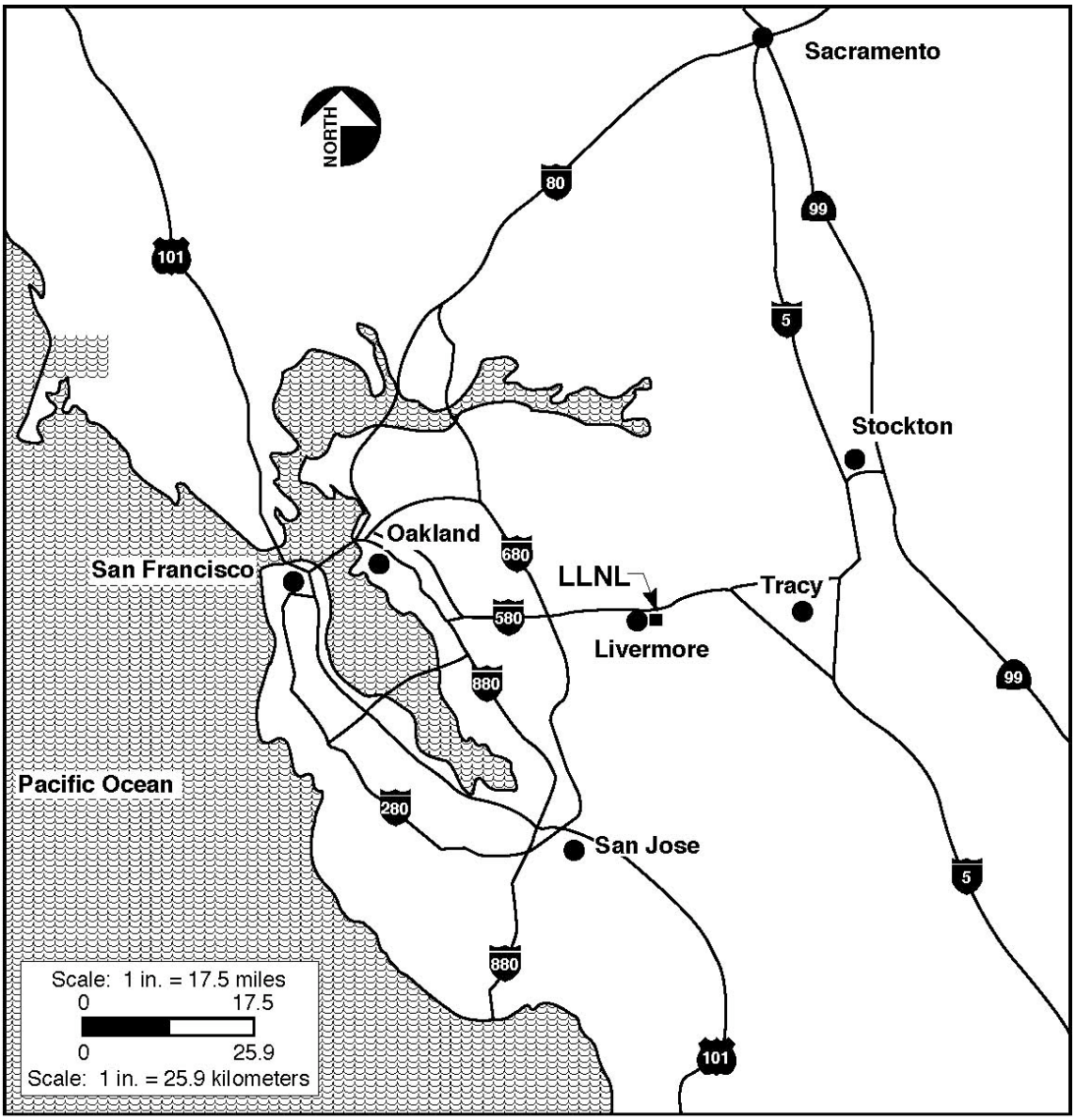

Figure 2-1 LLNL Location Map

As a government laboratory, LLNL conducts a wide variety of research. The hazardous wastes generated are managed on site at the Radioactive and Hazardous Waste Management Program (RHWM) facilities. B419 facilities had been part of the active RHWM complex until 1989.

According to LLNL, the U.S. Navy had constructed B419 in the late 1940s for use as an aircraft maintenance and repair facility. LLNL began using the area as a hazardous, mixed, and radioactive waste management facility in 1975. From 1983 until 1989, the area had been operated as a waste management area under interim status issued by the DTSC.

3.0 Description of Building 419 Treatment and Storage Facilities

Building 419 was located in the southeast corner of LLNL Livermore site. Building 419 was constructed by the U.S. Navy for a variety of activities involving airplane maintenance and repair. Later, LLNL operated an assay laboratory in the building before managing hazardous and mixed wastes. The waste management activities began in 1975 and continued until 1989. The waste handling operations were discontinued because the structure did not meet the Uniform Building Code seismic guidelines in effect at that time. Hazardous and mixed waste operation in the area included equipment decontamination, size reduction, solidification and less than 90 day storage activities (**see Figure 3-1**). Areas involved in waste management activities included room 124 (1800 square feet), room 155 (900 square feet), and room 167 (600 square feet). The structure also contained associated utility rooms and office space above the utility rooms. B419 facilities included the north and west yards for staging and storage of wastes handled in the building. The west yard included two 500-gallon tanks in a below-ground vault used to store waste for less than 90 days and a waste accumulation area (WAA). The two 500-gallon tanks collected liquid wastes via gravity fed underground pipes from rooms 124 and 167. The north yard was used as a staging area and a WAA was located in the south side of the building.

According to LLNL, the following closure activities had occurred prior to the final closure.

- The activities relative to the Size Reduction Unit in room 124 were closed in accordance with *Closure Plan for the B-419 Size Reduction Unit and Solidification Unit*, dated 1994. All equipment, except for the walk-in fume hood, was removed.
- The activities relative to the Solidification Unit in rooms 155 and 167 were closed in accordance with *Closure Plan for the B-419 Size Reduction Unit and Solidification Unit*, dated 1994. All equipment, except for the walk-in fume hood, was removed in room 167.
- The two 500-gallon retention tanks in the west yard and the associated underground piping under room 167 and the west yard were removed in 1995.
- The two WAAs in proximity of B419 were closed. WAA B-419B was used as less than 90 day storage area for the Plant Engineering Battery Shop operations and was not used to manage wastes related to B419 hazardous and mixed waste operations.

See Final Closure Plan for Building 419, Volume 1, dated March 2009, for more detail about the previous closure activities. The previous closure activities are not a part of this closure report and certification.

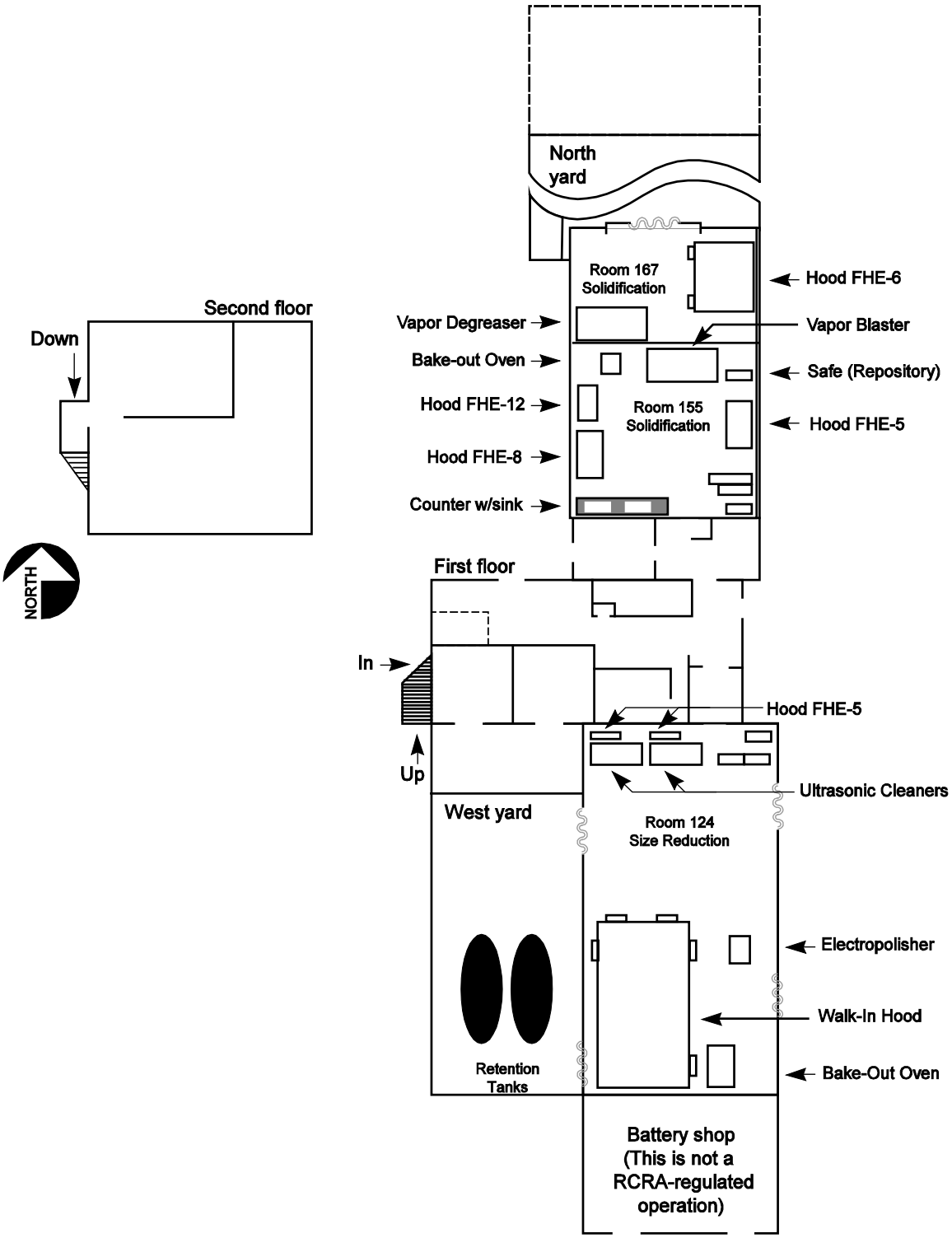

Figure 3-1 Building 419 Waste Treatment and Storage Facility

3.1 Condition of Building 419 Facilities Before the Closure Activities Began

As mentioned above, hazardous and mixed waste management activities have not occurred at B419 since 1989. The facilities included B419 structure and associated yards. No wastes or waste management equipment remained in the building except for two walk-in hoods, one in room 124 and one in room 167. The following is a brief description of each area included in the final closure activities.

3.1.1 Room 124

Room 124 covered an area 30 feet by 60 feet and was used for size reduction activities. The room was located on the south end of B419. The room was totally enclosed. The walls and floor were made of concrete, and the ceiling and roof were made of plaster, wood and shingles. The concrete slab floor included drains that were filled with concrete. A walk-in hood remained near the southwest side of the room (see **Figure 3-2**).

Figure 3-2 Building 419 Room 124

3.1.2 Room 155

Room 155 covered an area 30 feet by 30 feet and was used for solidification activities (see **Figure 3-3**). The room was totally enclosed. The walls and floor were made of concrete, and the ceiling and roof were made of plaster, wood and shingles. The concrete slab floor was covered with tile. No waste management equipment remained in this room.

Figure 3-3 Building 419 Room 155

3.1.3 Room 167

Room 167 covered an area 30 feet by 20 feet and was used for solidification activities (see **Figure 3-4**). The room was totally enclosed. The walls and floor were made of concrete, and the ceiling and roof were made of plaster, wood and shingles. A walk-in hood and a pad, where a degreaser was installed, remained on the northeast and southwest corners of the room respectively. Parts of the concrete floor were removed in previous closure activities to remove the floor drains and underground piping, and new floor sections had been installed.

Figure 3-4 Building 419 Room 167

3.1.4 Building 419 Utility and Office Areas

The two story middle section of the concrete and wooden building consisted of a lobby, utility rooms, wash rooms, storage rooms and offices (see **Figure 3-5**). These areas were not used as hazardous and mixed waste management areas.

Figure 3-5 Building 419 Office Area

3.1.5 North and West Yards

The north and west yards were contiguous and surrounded by 8 ft. high cyclone fence. The north yard was used as a staging area for the waste operations (see **Figure 3-6**). The yard was covered by a concrete pad adjacent to the room 167 roll up door, and the rest of the yard was covered with asphalt. An asphalt berm existed on the north end of the yard.

Figure 3-6 North Yard

The west yard was used as a staging area, housed two 500-gallon waste tanks and a temporary waste storage area. The tanks were used for less than 90 day waste storage, and were placed in an underground concrete vault measuring approximately 14 ft. X 10 ft. The vault was covered by a stainless steel cover (see **Figures 3-7 and 3-8**). The temporary waste storage area and the tanks had been removed during previous partial closures, and the concrete tank vault and its cover remained.

Figure 3-7 Temporary Storage Tank Vault

Figure 3-8 Temporary Storage Tank Vault Cover

3.1.6 Battery Shop

The Battery Shop, Room 1500, was located at the south end of Building 419 and was used for managing batteries. The Battery Shop was not used for waste management activities and was demolished with Building 419.

4.0 Phase I Closure Activities

Phase 1 closure activities consisted of implementing the DTSC approved closure plan dated March 2009. Activities included the following:

- Collecting and analyzing samples in accordance with the Sampling and Analysis Plan for the Building 419 facility, appendix A to the approved closure plan,
- Demolishing Building 419 structure,
- Collecting and analyzing background samples in accordance with the approved Plan,
- Analyzing sampling results, and
- Developing closure performance standards.

4.1 Preparations Before Closure Activities Began

Before the closure activities started, LLNL prepared a specific Health and Safety Plan in the form of an Integrated Work Sheet (IWS). The IWS was reviewed and approved by industrial safety, health physics, fire protection and environmental disciplines in the LLNL ES&H Team. The IWS was sent to the DTSC for review on June 14, 2010 (see **Appendix D)**. LLNL provided additional information regarding Standard Operating Procedures and Hazard Assessment and Control Form in a letter dated August 10, 2010 (see **Appendix D).**

Also, the following activities took place:

LLNL staff located underground utilities and marked them. LLNL staff identified and disconnected the utilities that came into site and had been used at B419. Three areas in the west yard area required excavation to locate underground utilities before drilling operations began. For safety reasons, the areas were excavated by removing asphalt sections and using pot-holing technique to expose the piping and utilities (**see Figure 4-1**).

Figure 4-1 Pot-holing Operations

The project team set up staging areas, signage, and equipment checkouts. The project team also obtained permits for abatement and demolition work from the Bay Area Air Quality Management District. See **Appendix E** for copies of the permits.

4.2 Sampling and Analysis

Sampling and analysis of B419 structure occurred in several sampling campaigns. The most recent DTSC approved sampling event for characterization of the waste generated during the structure demolition was conducted in 2007. As a result, the facility structure, which excluded the concrete floor, was characterized as low-level radioactive or mixed waste as appropriate. The sampling results were included in the final closure plan approved in March 2009. Sampling activities and results conducted prior to 2009 were included in the approved closure plan and are not covered in this report.

Sample numbers were written on each location before the sampling teams arrived (See **Figure 4-2**).

Figure 4-2 Sample Location Marking

Sampling log books, Chain of Custody (COC) forms and sample labels were prepared in advance. The sampling lead was in charge of the documents and issued them to personnel as needed. Complete sets of the COCs and log books have not been included in this report due to a large number of samples resulting in large volume of documentation. However, they are available upon request. Example copies of the COC and log books have been included in **Appendix F**.

A sampling team consisting of Weiss and Associates, Gregg Drilling, and LLNL personnel began Concrete, Asphalt and Soil (CAS) sampling activities in the north and west yards (see **Figure 4-3**).

Figure 4-3 Sampling Team at the North Yard

LLNL drilled 70 boreholes and collected samples from multiple depths in these boreholes. **Figure 4-4** shows the CAS samples obtained and analyzed for the project. The figure includes samples taken during phase II of the project including the building foot print and the tank vault.

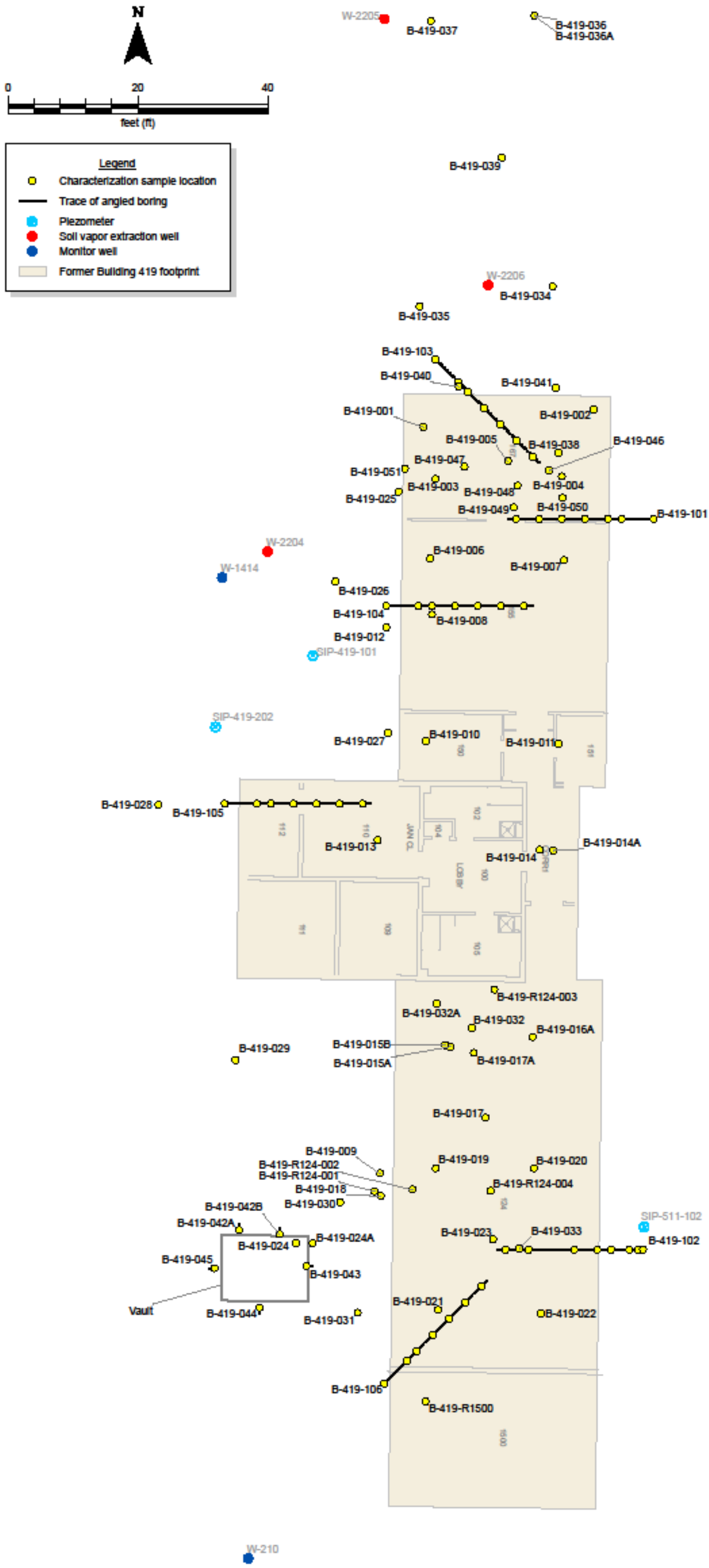

Figure 4-4 Building 419 CAS Sample Locations

CAS sampling and analysis occurred as described in **Appendix B**, and the Sampling and Analysis Plan, of the approved closure plan (LLNL, 2009) except for the deviations explained in **Section 1.4** of this report.

LLNL also obtained two groundwater samples at B-419-40 and B-419-41 at 99.7 ft. and 90 ft., respectively. Groundwater samples were collected using a bailer and decanted directly into sample containers.

Sampling and analysis of the concrete floor and soil from areas under the building foot print occurred after the building demolition. Concrete cores and asphalt samples were collected, where appropriate, and soil samples were collected at the surface and at 2, 5, 10, and 15-ft. depths and analyzed for gross alpha, gross beta, tritium, metals and organic compounds. The approved closure plan stated, "If the samples from 5 and 10 ft. do not show contamination, then the sample location will be considered clean, i.e., the sample collected from a depth of 15 ft. will not be tested." LLNL fully analyzed the samples obtained at surface, 2, 5 and 10 ft. LLNL also analyzed samples at 15 ft. for VOCs so that the holding time for the analysis would not be exceeded.

In addition to the prescribed locations indicated in the approved closure plan, LLNL obtained 4 additional soil samples under the waste pipe locations at 5, 10 and 15 ft. depths as measured from the soil surface under the concrete floor. The soil samples were obtained at junction points, locations of staining or points where damaged pipes were observed. LLNL also obtained swipe samples from inside the waste pipes at every 20 ft. and every elbow. The swipe sample results were used for waste characterization and meeting the disposal facility waste acceptance criteria.

The concrete core samples were collected using a drill; soil samples were collected using the direct push method (see **Figure 4-5**).

Figure 4-5 Direct Push Sampling Rig

The direct push method to obtain soil samples is preferable because it minimizes waste generation of excess soil cuttings. After samples were obtained, borings were backfilled using 20 percent bentonite slurry.

Bore hole logs were maintained during sampling (see **Appendix G)**.

EPA Method 5035 was used for collecting soil samples for volatile analysis. Soil samples were collected by "pushing" an approximately 2-inch diameter sampling core barrel, lined with acetate sleeves, to the target sampling depth. Once the sleeves were retrieved, EnCore samplers were used to collect soil sample for VOCs analysis. The remaining soil was used to obtain samples for metals, organic compounds and radioactive materials, as appropriate. Samples were then stored in an ice chest, and shipped to the laboratory (see **Figure 4-6)**.

Figure 4-6 Sample Handling On-Site

Field and laboratory QC samples were prepared and analyzed in accordance with the approved final closure plan.

In addition to samples taken in accordance with the sampling plan (LLNL, 2009), LLNL chose six sample locations and obtained samples, identified as B-419-101 through B-419-106. The samples were taken before the building demolition, therefore, boreholes were drilled at an angle so the samples were obtained from underneath the structure (see **Figure 4-4**). The quality

assurance and quality control (QA/QC) requirements outlined in the approved closure plan (LLNL, 2009) were followed for obtaining and processing the samples.

Other surveys and samples of the facility were analyzed in accordance with DOE and LLNL internal policies. These samples generally focused on radioactive characterization of wastes. The details of these samples will not be covered in this report.

Reusable drilling and sampling equipment was decontaminated after use at each sampling location. Decontamination rinsate was collected, sampled, analyzed, and disposed as appropriate.

4.3 Background Sampling:

Based on DTSC approved sampling plan, LLNL also conducted background sampling and analysis using the Multi-Agency Radiation Survey & Site Investigation Manual (MARSSIM) approach. See **Appendix H** for details. In summary, LLNL collected 35 samples from randomly selected locations (see **Figure 4-7**).

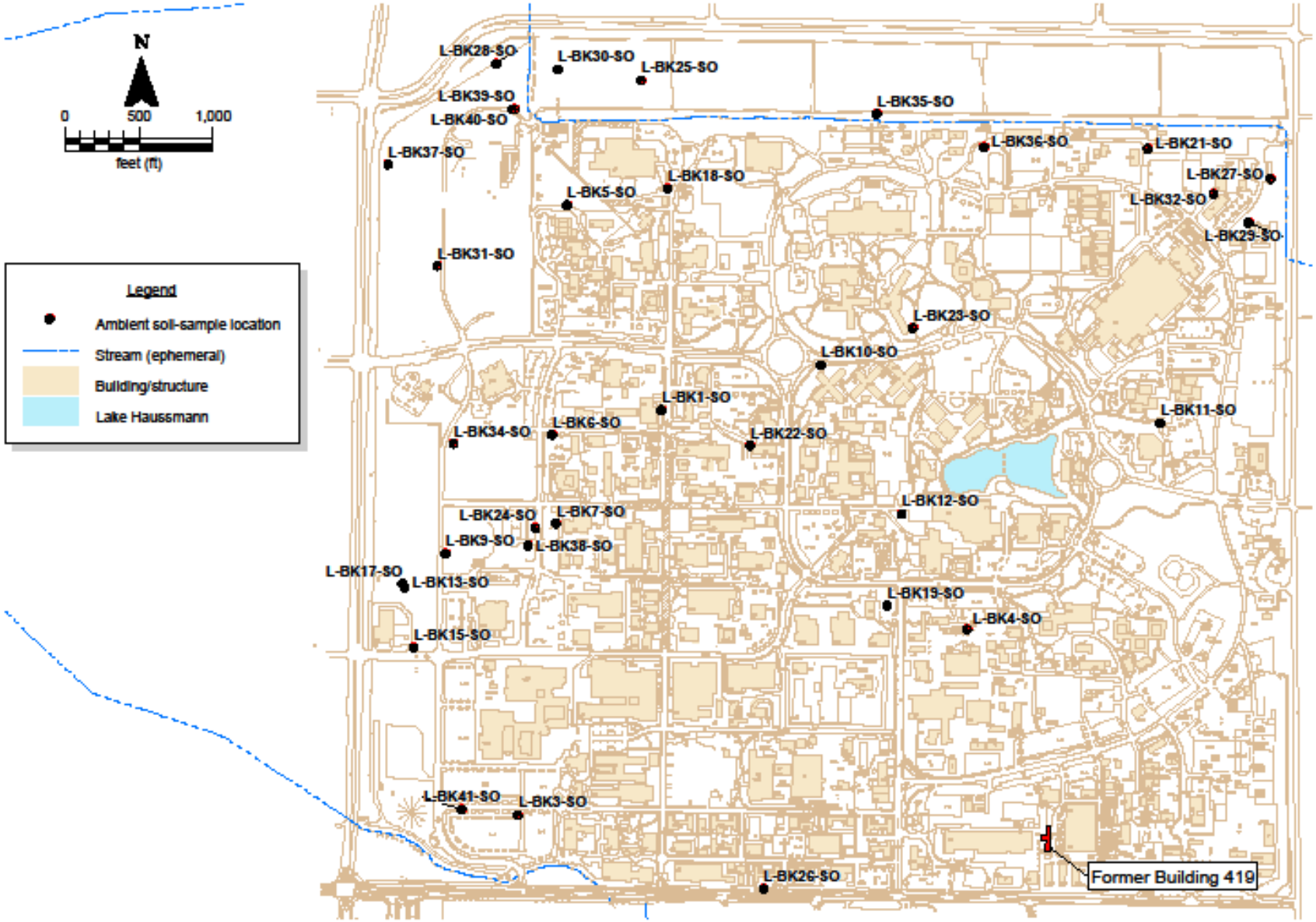

Figure 4-7 Background Sample Locations

The random locations were selected among areas that were known not to be impacted by LLNL operations. Using GPS, LLNL personnel located the samples based on the DTSC approved sampling plan (see **Figure 4-8**).

Figure 4-8 Locating Background Samples

One composite sample was collected from 6 inches to 2 feet below grade from each location. Samples were analyzed by Australian Laboratory Services Environmental Services (ALS), a California certified laboratory, for TTLC metals and radioactive materials, **Table 1** contains a list of the constituents.

Table 1 List of Hazardous and Radioactive Constituents for Background Sample Analysis

TTLC Metals List	Radioactive Materials list
Antimony	Actinium 228
Arsenic	Bismuth 214
Barium	Gross alpha
Beryllium	Gross beta
Cadmium	Lead 212
Chromium	Lead 214
Cobalt	Potassium 40
Copper	Thallium 208
Hexavalent Chromium	Thorium 228
Lead	Thorium 230
Mercury	Thorium 232
Molybdenum	U234+U233
Nickel	U238
Selenium	
Silver	
Thallium	
Vanadium	
Zinc	

4.4 Building 419 Structure Demolition and Removal

Building 419 structures, including rooms 124, 155, 167, the battery shop, office area, and the utility rooms, were demolished beginning December 1, 2010.

Before demolition of the structure began, LLNL identified areas that contained asbestos material and removed them. A permit for asbestos removal was obtained from the Bay Area Air Quality Management District (see **Appendix E)**, before the removal operations took place.

Also, before the building demolition began, LLNL removed areas on the walls and floors with known radioactive contamination and applied fixative on the interior surfaces, in order to minimize potential worker exposure See **Appendix I** for a copy of MSDS and Product Data Sheet.

An excavator was used to demolish the building starting from the battery shop at the south end of the building. The demolition progressed from room to room in order to segregate the waste in accordance with the requirements of the approved closure plan, (see **Figure 4-9**).

Figure 4-9 Structure Demolition, Inside of Room 124 Shown

The project team processed the concrete by size reducing and removing rebar as appropriate, segregating wood debris and loading the demolition debris into appropriate containers, (See **Figure 4-10**).

Figure 4-10 Demolition Debris Loaded Into Containers

The project team then moved the containerized waste to the waste accumulation area (WAA), set up at area 4100. See **Section 6.0** for more detail on the WAAs.

During this process, water spray was used to minimize dust from the operations. Dust monitors were set up at the perimeter fence and on the personnel to measure the effectiveness of the dust suppression method (see **Figures 4-11 and 4-12**).

Figure 4-11 Water Spray Used During Demolition

Figure 4-12 Instruments Used to Monitor Dust Levels During Demolition

The project Industrial Hygienist was responsible for checking the monitors to ensure their proper operations and ensure that the dust levels did not exceed action levels. The action levels consisted of 2005 American Conference of Governmental Industrial Hygienist Threshold Limit Values Occupational Exposure Limits of 3mg/m3 respirable particles and 10 mg/m3 inhalable particles.

The removal of the concrete floors was scheduled for phase II of the closure project since it provided a barrier for contaminant dispersion and migration in case of soil contamination, as well as a stable foundation for heavy equipment. However, as a part of the phase 1 activities, concrete and soil samples were collected and the remaining underground waste piping under room 124 was removed.

The underground waste pipes under room 124, the west yard and room 167 led to the two underground tanks previously located in the vault in the west yard. The underground piping in the yard and under room 167 was removed in a previous partial closure activity that occurred in the mid-1990s. Room 124 waste pipe removal activities consisted of saw cutting the concrete floor (see **Figure 4-13**), and exposing the pipes by removing the concrete pieces and soil (see **Figure 4-14**).

Figure 4-13 Saw Cutting Operations to Expose Piping under Room 124

Figure 4-14 Excavation Operations to Expose Piping under Room 124

Care was taken to pile the soil near where it was removed for purposes of backfilling (see **Figure 4-15**). This would allow for waste minimization opportunities in case soil samples revealed contamination.

Figure 4-15 Soil Segregation and Excavation Operations to Expose Piping under Room 124

Generally, the underground pipes were in good condition and no obvious staining or odors were observed. The piping had been left in place by plugging the floor drains using concrete and there were no obvious old breaks or leakage from the pipes. The breaks that were observed in the pipes appeared to be as a result of the concrete and soil removal. Where breaks were observed, the crew isolated the area and ensured that the pipe did not include any liquids (see **Figure 4-16**).

Figure 4-16 Isolating a Break in the Pipe

LLNL staff cut the piping in sections (see **Figure 4-17**), and drained them as necessary (see **Figure 4-18**).

Figure 4-17 Pipe Cutting Operations

Figure 4-18 Draining Underground Pipes

The crew wrapped each individual section of the pipe (see **Figure 4-19**), and staged them for further handling (see **Figures 4-20**).

Figure 4-19 Workers Wrapping Sections of Pipe

Figure 4-20 Sections of Pipe Staged for Further Handling

The residues in the pipe sections were sampled in order to ensure that waste met the disposal facility waste acceptance criteria (**see Figure 4-21**).

Figure 4-21 Sampling Residues inside the Pipe Segments

Soil samples were obtained after pipe removal, see section 4.2. The trenches were then backfilled, awaiting the results of the samples (see **Figure 4-22**).

Figure 4-22 Backfilled Trenches

The intact concrete areas were sprayed using a fixative, and areas where the concrete was cut were covered with plastic in order to protect against spread of contamination, if any (see **Figure 4-23**). See **Appendix I** for a copy of the MSDS and product data sheet for the fixative material.

Figure 4-23 Covered Project Site after Underground Pipe Removal Operations

5.0 Sampling Results

ALS Environmental, and BC Laboratories, which are certified by the State of California for the analyses performed, analyzed the samples. Due to a large number of samples generating large volumes of sample results, a complete copy of the laboratory documentation has not been provided in this report; however, the complete set of data is maintained by LLNL. This section summarizes the analytical results.

5.1 Background Sampling Results

The background levels for heavy metal constituents and radioactive materials, **Tables 2 and 3** respectively, were developed using background sampling results and approved methodology by the DTSC, see **Appendix H**. Any detection of volatile organic compounds was considered above background.

Table 2 Metal Constituents Background Levels

Constituent	Background Value (mg/kg)	Constituent	Background Value (mg/kg)
Antimony	2.2	Lead	14.3
Arsenic	7.59	Mercury	0.0759
Barium	332	Molybdenum	1.1
Beryllium	0.55	Nickel	70.1
Cadmium	0.55	Selenium	0.55
Chromium	48.9	Silver	1.1
Cobalt	16.7	Thallium	1.1
Copper	35.8	Vanadium	43.7
Hexavalent Chromium	2.2	Zinc	69.8

Table 3 Radioactive Materials Background Levels

Constituent	Background Value (pCi/g)	Constituent	Background Value (pCi/g)
Actinium 228	1.5	Lead 212	0.938
Aluminum 26	0.133	Lead 214	0.844
Am 241 GS	0.539	Manganese 54	0.159
Americium 241	0.062	Niobium 94	0.137
Antimony 124	0.145	Niobium 95	0.169
Antimony 125	0.35	Plutonium 238	0.0355
Beryllium 7	1.15	Plutonium 239+240	0.046
Bismuth 212	2.52	Potassium 40	18.4
Bismuth 214	0.912	Protactinium 234m	29.6
Carbon 14	10.2	Ruthenium 106	1.25
Cerium 139	0.0777	Scandium 46	0.134
Cerium 144	0.626	Silver 110m	0.161
Cesium 134	0.189	Sodium 22	0.188
Cesium 137	0.16	Strontium 90	0.264
Chromium 51	0.957	Technetium 99	0.647
Cobalt 56	0.428	Thallium 208	0.371
Cobalt 57	0.0547	Thorium 227	1.05
Cobalt 58	0.181	Thorium 228	0.991
Cobalt 60	0.154	Thorium 230	0.957
Curium 242	0.0143	Thorium 232	0.983
Curium 244	0.0269	Thorium 234	2.44
Europium 152	0.88	Tritium	0.106
Europium 154	0.852	Uranium 234 and Uranium 233	0.76
Europium 155	0.34	Uranium 235	0.645
Gross alpha	3.38	Uranium 235 and Uranium 236	0.0904
Gross beta	4.47	Uranium 238	0.717
Iodine 131	0.395	Zinc 65	0.261
Iron 59	0.399		

5.2 Concrete, Asphalt and Soil (CAS) and Ground Water Sample Results

LLNL drilled 70 boreholes and collected samples from multiple depths in these boreholes for soil and waste characterization purposes. The characterization included samples from the

foundation concrete, surface asphalt, gravel base material beneath the surface layer, as well as soil at depth.

Based on the sampling results, and in accordance with the approved closure plan, the demolition debris and soils were characterized either as low-level radioactive or mixed wastes. See **Table 11** for details about the types of waste that were generated as a result of the closure activities.

Appendix J contains data for soil sample locations where hazardous constituent levels and radioactive materials were found to be above background values. Complete sets of analytical results are maintained by LLNL.

The approved closure plan (LLNL, 2009) states, "The STLC will be run if the total constituent concentration is equal to or greater than 10 times the STLC hazardous waste threshold. The TCLP will be run if the total constituent concentration is equal to or greater than 20 times the TCLP hazardous waste threshold." The results of the sample locations listed in **Table 4** triggered the conditional analysis.

Table 4 Sampling Location Triggering Conditional Analysis

Sample location	Sample Depth (feet)	Sample location	Sample Depth (feet)
B-419-004	2, 5, 15	B-419-037	1
B-419-011	15	B-419-038	2, 5, 10
B-419-014A	2	B-419-039	1
B-419-014	4.5	B-419-042A	1
B-419-015B	10	B-419-042B	1
B-419-021	4	B-419-046	1, 5,10
B-419-027	1	B-419-050	1
B-419-028	1	B-419-R124-001	3
B-419-029	1	B-419-R124-003	3
B-419-030	1	B-419-R124-004	3

Appendix K contains data for concrete and asphalt samples, including the composite area information.

LLNL also performed analysis on two groundwater samples obtained at B-419-40 and B-419-41 at 99.7 ft. and 90 ft. respectively. **Table 5** contains the analytical results for the groundwater samples.

Table 5 Groundwater Sample Results

Sample Location	Analyte	Result	Units
B-419-040	Arsenic	0.045	mg/L
B-419-040	Barium	2.5	mg/L
B-419-040	Beryllium	0.0069	mg/L
B-419-040	Chromium	0.3	mg/L
B-419-040	Cobalt	0.094	mg/L
B-419-040	Copper	0.22	mg/L
B-419-040	Gasoline fingerprint	0.35	mg/L
B-419-040	Hexavalent Chromium	0.0089	mg/L
B-419-040	Lead	0.066	mg/L
B-419-040	Mercury	0.00034	pCi/L
B-419-040	Nickel	0.49	pCi/L
B-419-040	Gross alpha	128	pCi/L
B-419-040	Gross beta	219	ug/L
B-419-040	Tritium	59700	ug/L
B-419-040	1,1-Dichloroethene	65	mg/L
B-419-040	1,2-Dichloroethane	110	mg/L
B-419-040	Trichloroethene	1200	mg/L

Sample Location	Analyte	Result	Units
B-419-041	Arsenic	0.023	mg/L
B-419-041	Barium	2.7	mg/L
B-419-041	Chromium	0.18	mg/L
B-419-041	Cobalt	0.058	mg/L
B-419-041	Copper	0.12	mg/L
B-419-041	Gasoline fingerprint	0.36	mg/L
B-419-041	Hexavalent Chromium	0.0089	mg/L
B-419-041	Lead	0.038	mg/L
B-419-041	Nickel	0.26	mg/L
B-419-041	Gross alpha	46	pCi/L
B-419-041	Gross beta	83	pCi/L
B-419-041	Tritium	59800	pCi/L
B-419-041	Tetrachloroethene	53	ug/L
B-419-041	Trichloroethene	1700	ug/L

In addition, LLNL performed radioactive materials speciation at four CAS locations. B-419-38, B-419-24, B-419-21 and R124-001, primarily to meet the disposal facility waste acceptance criteria.

5.3 Clean Closure Performance Standards:

Since clean closure based on the background levels was not reasonably achievable, LLNL decided to pursue clean closure performance standards based on already established health based screening levels. As a result, LLNL, in negotiations with the DTSC staff, developed a new set of performance standards; see **Appendix L** for presentation, correspondence, and DTSC approval letter, dated September 24, 2010.

In summary, the Regional Screening Levels (RSLs, formerly referred to as preliminary reme dial goals -PRGs) defined by U.S. EPA Region 9 (EPA, 2012), were used primarily to define the soil screening levels. The RSLs consider the following pathways for residential exposure:

- Ingestion from drinking groundwater
- Inhalation of volatiles from groundwater
- Ingestion from drinking surface water

- Inhalation of volatiles from surface water
- Ingestion of soil
- Inhalation of particulates
- Inhalation of volatiles from soil
- Dermal adsorption from soil

The closure standards for radionuclides were defined using the U.S. EPA Soil Screening Guidance for Radionuclides (U.S. EPA, 2000). Other clean closure standards were defined using DTSC guidance.

- The clean closure standard for lead was defined using the DTSC Human Health Risk Assessment Note 3 (DTSC, 2012).
- The clean closure standards for cobalt and thallium were defined using the California Human Health Screening Levels (OEHHA, 2010).
- The clean closure standard for tritium in soil moisture was defined using the DOE Order 458.1 (DOE, 2011).
- The clean closure standards for polycyclic aromatic hydrocarbons (PAHs) were defined using the DTSC guidance for 'Use of the Northern and Southern California Polynuclear Aromatic Hydrocarbon (PAH) Studies' based on the benzo(a)pyrene equivalency (DTSC, July 2009).
- The clean closure standard for arsenic was defined using the regional background value based on the study conducted by the San Francisco Regional Water Quality Control and San Francisco State University (Duverge, 2011).
- The clean closure standards for total chromium, hexavalent chromium, gross alpha, gross beta, and potassium 40 were defined using the site background values.

Tables 6, 7, and 8 outline the clean closure standards, also called Screening Levels in the appendices versus the background levels for metals, organic compounds, and radioactive materials for constituents that were detected in B419 project soil samples. For a complete list of values mentioned in references above see **Appendix M**.

Table 6 Building 419 Final Closure Metals Clean Closure Performance Standards

Compound	LLNL Background Level (mg/kg)	Building 419 Closure Clean Closure Performance Standards (mg/kg)
Antimony	2.2	31
Arsenic	7.59	11
Barium	332	15000
Beryllium	0.55	160
Cadmium	0.55	70
Chromium	48.9	48.9
Cobalt	16.7	660
Copper	35.8	3100
Hexavalent Chromium	2.2	2.2
Lead	14.3	400
Mercury	0.0759	10
Molybdenum	1.1	390
Nickel	70.1	1500
Selenium	0.55	390
Silver	1.1	390
Thallium	1.1	5
Vanadium	43.7	78
Zinc	69.8	23000

Table 7 Building 419 Final Closure Organic Compounds Clean Closure Performance Standards

Compound Description	Building 419 Clean Closure Performance Standards (mg/kg)
1,1-Dichloroethene	240
1,2-Dichloroethane	0.43
Acetone	61000
Benzene	1.1
Carbon tetrachloride	0.61
Methylene chloride	11
Tetrachloroethene	0.55
Toluene	5000
Trichloroethene	0.91
Benzo(a)anthracene	0.4
Benzo(b)fluoranthene	0.4
Bis(2-ethylhexyl)phthalate	35
Chrysene	15
Diesel Fuel[1]	N/A
Fluoranthene	2300
Gasoline fingerprint[1]	N/A
m- and p-Xylene Isomers	630
Naphthalene	3.6
PCB 1248	0.22
PCB 1254	0.22
Phenanthrene	0.4
Pyrene	1700

[1] Analysis of some soil samples from the yards showed diesel fuel and gasoline fingerprint. However, according to LLNL no action was required since the compounds were not found within the Building 419 footprint per DTSC.

Table 8 Building 419 Final Closure Radioactive Materials Clean Closure Performance Standards

Compound Description	LLNL Background Value (pCi/g)	Building 419 Clean Closure Performance Standards (pCi/g)
Actinium 228	1.5	679
Americium 241	0.062	1.8
Bismuth 214	0.912	7950
Cesium 137	0.16	4.02
Cobalt 56	0.428	0.651
Curium 242	0.0143	320
Gross alpha	3.38	3.38
Gross beta	4.47	4.47
Lead 212	0.938	3550
Lead 214	0.844	44800
Plutonium 238	0.0355	2.95
Plutonium 239+240	0.046	2.58
Potassium 40	18.4	18.4
Strontium 90	0.264	0.344
Thallium 208	0.371	23100
Thorium 228	0.991	23.4
Thorium 230	0.957	3.46
Thorium 232	0.983	3.07
Thorium 234	2.44	1270
Tritium	0.106	110
Uranium 234 and Uranium 233	0.76	3.86
Uranium 235 and Uranium 236	0.0904	0.192
Uranium 238	0.717	4.48

5.4 Comparison of Closure Performance Standards to Site Data

Comparison of the soil analytical results and the clean closure performance standards showed 153 soil analysis results out of 692 exceeded their respective closure standards. 32 out of 70 locations contained soil with residual contamination levels above the clean closure standards. **Table 9** lists the contaminants, locations, maximum detected concentrations and the relevant clean closure performance standards. This data was used to determine areas for excavation activities.

Table 9 Soil Contaminant Levels Exceeding Clean Closure Performance Standards

Constituent	Sample Locations Detected	Maximum Detected Concentration	Clean Closure Performance Standard
Arsenic	15A, 34	37 (mg/kg)	11 (mg/kg)
Chromium	4, 11, 12, 14A,	300 (mg/kg)	48.9 (mg/kg)
Hexavalent Chromium	14, 38, 49, 3, 48, 41, 15A, 18, 28, 29, 30, 34, 35, 38, 39, 40, R124-3	12 (mg/kg)	2.2 (mg/kg)
Mercury	37, 38, 50	66 (mg/kg)	10 (mg/kg)
Vanadium	15A	1080 (mg/kg)	390 (mg/kg)
Diesel Fuel[1]	--	610 (mg/kg)(1)	-
Gasoline fingerprint[1]	--	1.2 (mg/kg) (1)	-
PCB1248	4, 50	0.35 (mg/kg)	0.22 (mg/kg)
PCB 1254	24, 28, 38, 42A, 42B	6.9 (mg/kg)	0.22 (mg/kg)
Americium 241	38	150 (pCi/g)	1.8 (pCi/g)
Cobalt 56	38	1.12 (pCi/g)	0.651 (pCi/g)
Gross alpha	3, 4, 5, 24, 46, 47, 48, 49, 50	262 (pCi/g)	3.38 (pCi/g)
Gross beta	4, 21, 38, 46	28.1 (pCi/g)	4.47 (pCi/g)
Plutonium 239+240	38	32.2 (pCi/g)	2.58 (pCi/g)
Strontium 90	38	1.15 (pCi/g)	0.344 (pCi/g)
Tritium	2, 4, 5, 6, 7, 38, 41, 46, 48, 49, 50, 51, 101	1920 (pCi/g)	110 (pCi/g)
Uranium 234 and Uranium 233	R124-001	18.4 (pCi/g)	3.86 (pCi/g)
Uranium 235 and Uranium 236	R124-001	1.39 (pCi/g)	0.192 (pCi/g)
Uranium 238	R124-001	46 (pCi/g)	4.48 (pCi/g)

[1] Analysis of some soil samples from the yards showed diesel fuel and gasoline fingerprint. However, according to LLNL no action was required since the compounds were not found within the Building 419 footprint per DTSC.

Figure 5-1 and **Figure 5-2** show the sample locations and sample depths for hazardous constituents and radioactive materials respectively for constituents that were detected above the clean closure performance standards. The italicized and highlighted labels indicate locations that have been excavated, see section 6.2 for more detail. **Appendix J** also includes sample locations and constituents that exceeded their respective clean closure performance standards.

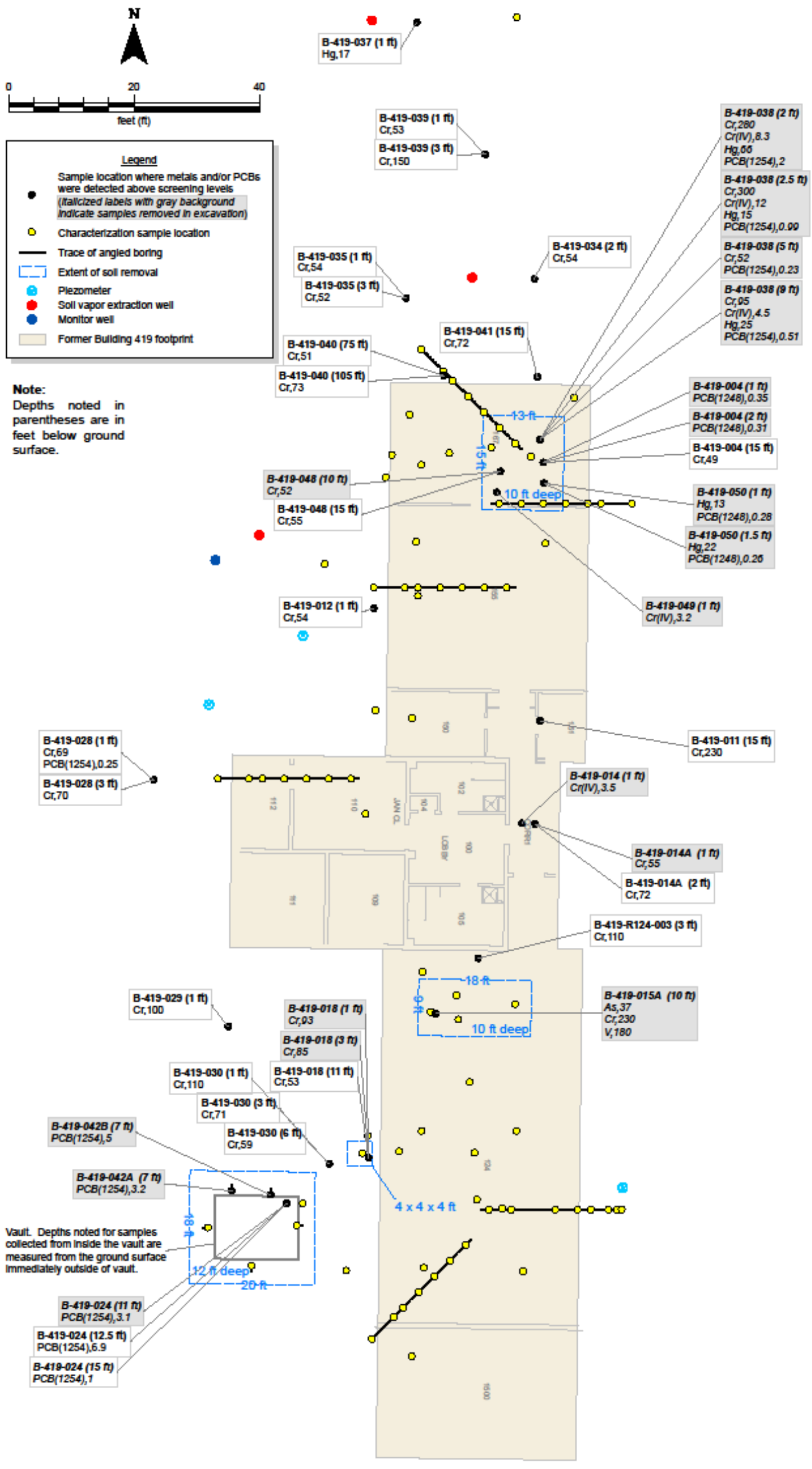

Figure 5-1 Locations of Hazardous Constituents Above Clean Closure Performance Standards in Soil at Building 419

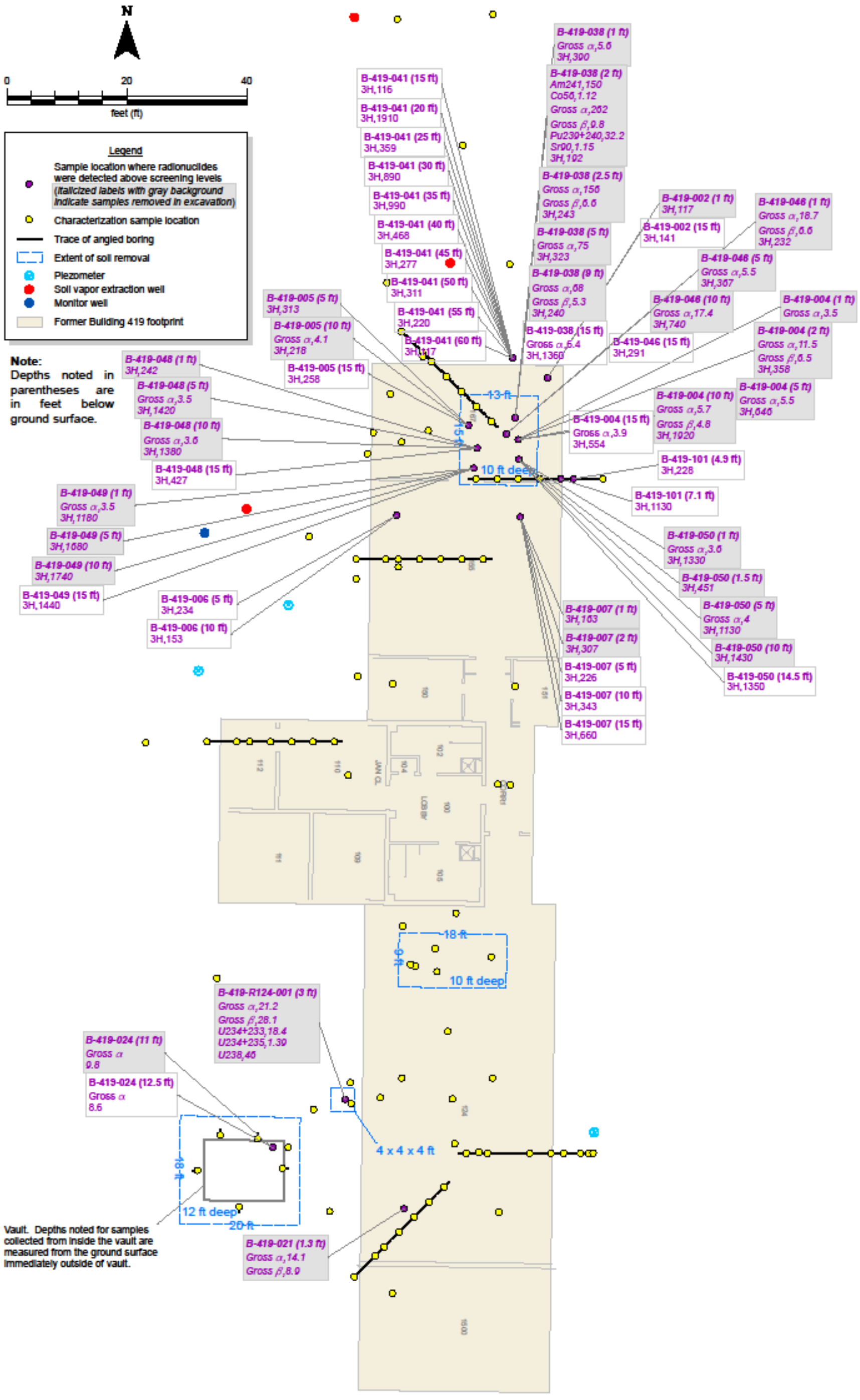

Figure 5-2 Locations of Radioactive Materials above Clean Closure Performance Standards in Soil at Building 419

6.0 Closure Activities Phase II

Phase II closure activities began September 4, 2012 and included the following:

- Removing concrete pad, pits and tank vault,
- Removing soil containing hazardous constituents above the clean closure performance standards,
- Conducting confirmation sampling and analysis,
- Performing statistical analysis of confirmation sampling and analysis results,
- Performing a human health risk assessment,
- Shipping mixed and low-level radioactive wastes to disposal facilities, and
- Paving the project site.

6.1 Concrete Pad, Pits and Vault Removal:

Once the concrete pad and the soil beneath the pad were characterized, saw cuts were made to delineate the low-level and mixed waste. The concrete floor was then removed (see **Figure 6-1**). The concrete floor from the building footprint was managed as low-level waste.

Figure 6-1 Removing Concrete Floor

Once the concrete floor was removed, concrete pits used by the US Navy were exposed. The pits were used for airplane maintenance purposes and were generally located under the utility rooms and 155. The pits were removed and managed as low-level radioactive waste (see **Figure 6-2**).

Figure 6-2 Concrete Pits Exposed after Removing the Concrete Floor

The concrete vault housing the two 500-gallon tanks in the West yard was demolished and removed. Before demolition of the concrete vault, LLNL removed approximately three feet of soil from all around the vault at a depth just below the concrete floor, approximately 12 feet (see **Figure 6-3**).

Figure 6-3 Tank Vault Removal Preparations

The concrete walls and floor were then demolished inside the excavated area (see **Figure 6-4**). The waste concrete rubble was managed as mixed waste.

Figure 6-4 Tank Vault Demolition

Water spray was used for dust suppression during the concrete demolition, processing and loading operations.

6.2 Soil Removal and Confirmation Sampling:

LLNL compared the soil sampling results to the newly developed clean closure performance standards, and removed the soils that contained constituents above the standards as indicated on **Figures 5-1 and 5-2**. The comparison revealed that contamination above the closure performance standards existed in specific areas, or at relatively shallow areas. The contamination that was limited to 1 ft. beneath the foundation was removed along with the building foundation. The removal of this soil was necessary to adequately remove the building foundation and the base materials. Based on an agreement with the DTSC for chromium, LLNL removed soil based on levels of hexavalent chromium contamination above the closure performance standards and not total chromium. Four areas required soil removal and confirmation sampling as follows (see **Figure 6-8**):

Area 1 consisted of an area measuring 13 ft. X 15 ft. and 10 ft. deep under room 167. This was an area under the walk-in hood located at the northeast of the room. Soil from the area was managed as mixed waste.

Area 2 consisted of soil from an area measuring 18 ft. X 9 ft. and 10 ft. deep under room 124. The excavated soil was managed as low-level radioactive waste.

Area 3 consisted of an area measuring 20 ft. X 18 ft. and 12 ft. deep at the tank vault. Soil from an area measuring approximately 3 ft. from tank vault walls on all sides and 12 ft. deep was removed (see **Figure 6-5**). The excavated soil was managed as mixed waste.

Figure 6-5 Excavation of the Tank Vault

Area 4 consisted of an area measuring 4 ft. X 4 ft. and 3 ft. deep adjacent to room 124. This was the point where waste conveying pipe to the tank vault was terminated in a previous partial closure activity. The excavated soil was managed as mixed waste.

A stained area of soil was observed to the north side of the excavated Area 1 measuring approximately 2 ft. deep from the gravel layer under the concrete slab (see **Figure 6-6**). A sample of the stained soil was taken before the excavated area was expanded and the stained soil removed.

Figure 6-6 Sampling of the Stained Area Under Room 167

The excavated areas were lined with a geotextile material (see **Appendix N**), and backfilled with clean fill (see **Figure 6-7**). See **Appendix O** for information regarding the backfill soil.

Confirmation samples were collected from each excavation as described in Section 6.3 prior to being lined. The purpose of the liner was to delineate boundaries of the excavation should additional work be required based on findings from the confirmation samples.

Figure 6-7 Excavation Areas Lining and Backfilling

6.3 Confirmation sampling:

LLNL implemented a DTSC approved confirmation sampling and analysis plan and a statistical approach (see **Appendix L**) to evaluate the results, see **Appendix P** for more detail.

After soil removal from each area, as described above, confirmation sampling and analysis were performed. The confirmation samples were analyzed for constituents of concern that were above the clean closure performance standards before the excavation. The analysis included TTLC metals, gross alpha and beta at the four excavation areas. The analysis of the samples from the excavation area at the Tank Vault also included PCB 1248 and PCB 1254. The analysis of the samples from the Room 167 excavation area included PCB 1248, PCB 1254 and hexavalent chromium. One sample from the bottom of the each of the excavation areas was analyzed for tritium.

Soil samples were obtained from each excavation area as indicated on **Figure 6-8**.

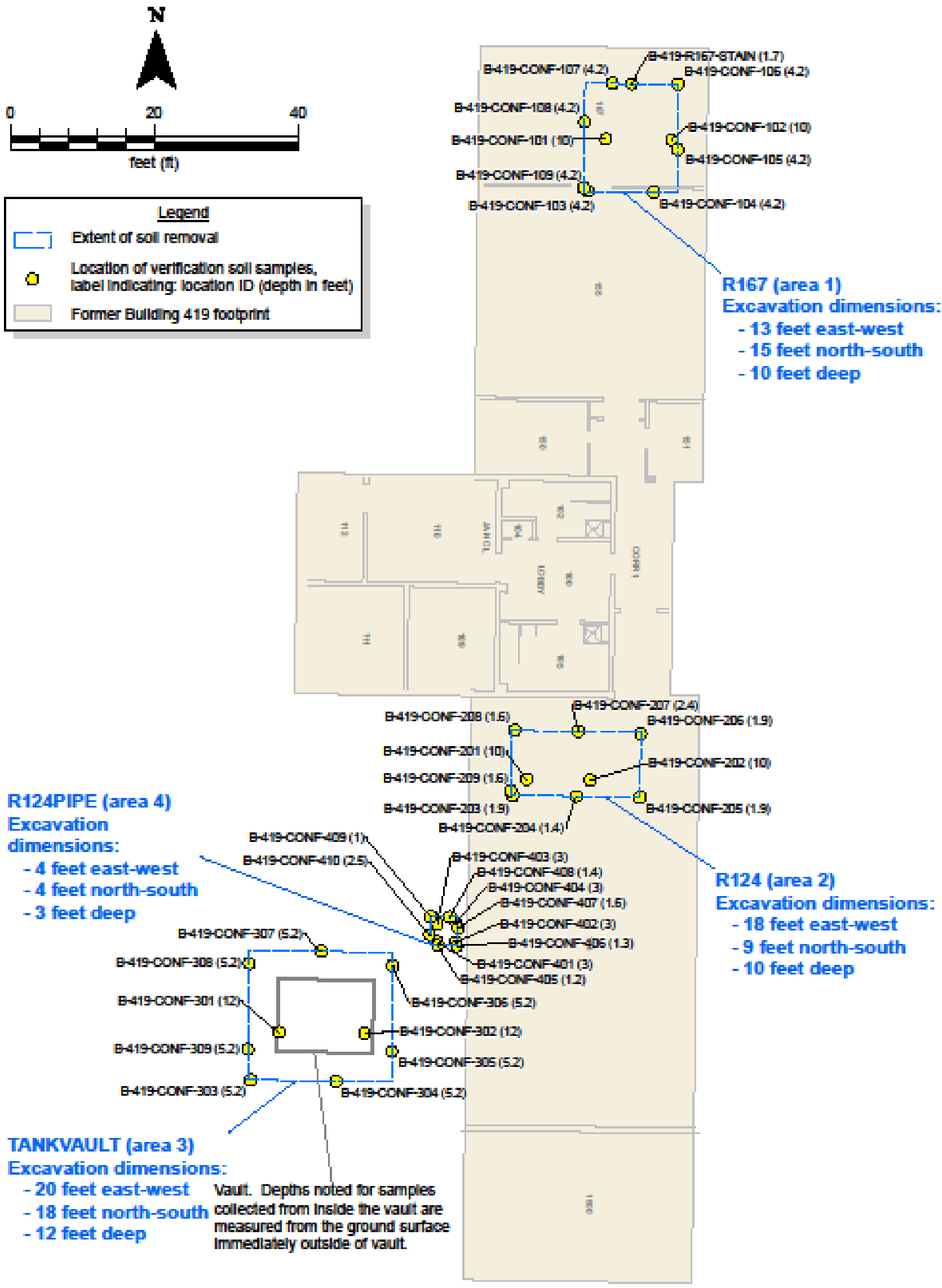

Figure 6-8 Confirmatory Sample Locations

6.4 Confirmation Sampling Analytical Results and Evaluation:

Table 10 lists the sample location and constituents that exceeded the clean closure standards.

Table 10 Confirmation sample Results exceeding Clean Closure Standards

Sample Location	Depth (Feet)	Analyte	Result	B419 Clean Closure Standards	Unit
B-419-CONF-101	10	Hexavalent Chromium	2.2[1]	2.2	mg/kg
B-419-CONF-101	10	Tritium	231	110	pCi/g
B-419-CONF-101	10	Tritium	412	110	pCi/g
B-419-CONF-102	10	Hexavalent Chromium	2.4[1]	2.2	mg/kg
B-419-CONF-102	10	Chromium	56	48.9	mg/kg
B-419-CONF-103	4.2	Hexavalent Chromium	2.2[1]	2.2	mg/kg
B-419-CONF-103	4.2	Chromium	66	48.9	mg/kg
B-419-CONF-104	4.2	Hexavalent Chromium	2.6[1]	2.2	mg/kg
B-419-CONF-104	4.2	Chromium	54	48.9	mg/kg
B-419-CONF-105	4.2	Hexavalent Chromium	2.2[1]	2.2	mg/kg
B-419-CONF-106	4.2	Hexavalent Chromium	2.2[1]	2.2	mg/kg
B-419-CONF-108	4.2	Hexavalent Chromium	2.2[1]	2.2	mg/kg
B-419-CONF-108	4.2	Chromium	60	48.9	mg/kg
B-419-CONF-109	4.2	Chromium	51	48.9	mg/kg
B-419-CONF-102	10	Gross alpha	3.7	3.38	pCi/g
B-419-CONF-105	4.2	Gross alpha	3.7	3.38	pCi/g
B-419-CONF-108	4.2	Gross alpha	5.2	3.38	pCi/g
B-419-CONF-402	3	Gross alpha	5.2	3.38	pCi/g
B-419-CONF-105	4.2	Gross beta	4.5	4.47	pCi/g
B-419-CONF-108	4.2	Gross beta	5.8	4.47	pCi/g
B-419-CONF-109	4.2	Gross beta	4.5	4.47	pCi/g
B-419-CONF-402	3	Gross beta	7.7	4.47	pCi/g
B-419-CONF-109	4.2	Hexavalent Chromium	2.2	2.2	mg/kg
B-419-CONF-109	4.2	PCB 1254	0.55	0.22	mg/kg
B-419-CONF-203	1.9	Thallium	5.4[1]	5	mg/kg
B-419-CONF-204	1.4	Thallium	5.2[1]	5	mg/kg

Sample Location	Depth (Feet)	Analyte	Result	B419 Clean Closure Standards	Unit
B-419-CONF-306	5.2	PCB 1254	0.39	0.22	mg/kg
B-419-CONF-307	5.2	PCB 1248	1.8[1]	0.22	mg/kg
B-419-CONF-307	5.2	PCB 1248	0.53[1]	0.22	mg/kg
B-419-CONF-307	5.2	PCB 1254	1.7	0.22	mg/kg
B-419-CONF-307	5.2	PCB 1254	4	0.22	mg/kg
B-419-CONF-401	3	Thallium	5.1[1]	5	mg/kg
B-419-CONF-404	3	Thallium	5.2[1]	5	mg/kg
B-419-CONF-410	2.5	Thallium	5.4[1]	5	mg/kg

[1] The detection limit exceeds the closure standards.

For a complete set of confirmation sampling results see **Appendix Q**.

LLNL evaluated the sampling results based on the DTSC approved methodology as follows; see **Appendix P** for more detail.

1. If the average of the results is greater than the clean closure standards, the excavation area does not meet the performance standard. No statistical test is performed.

2. If all of the individual results are below the clean closure standards, the excavation area meets the closure performance standard. No statistical test is performed.

3. If one or more individual results are above the clean closure standards and the average is below the standards, then the Wilcoxon Rank Sum test or Sign test is performed.

Based on LLNL's evaluation, the four excavation areas met the closure performance standards, except for PCB 1254 at the Tank Vault excavation area.

6.5 Risk Assessment

In support of clean closure determination LLNL conducted a human health risk assessment to determine whether the remaining PCB contamination at the former Tank Vault location is a risk to human health (see **Appendix R**). The risk assessment evaluated the carcinogenic risk and non-carcinogenic hazards associated with the PCB residuals, and was conducted in accordance with the DTSC approved methodology.

The risk assessment concluded that the carcinogenic health risk is within the range of 1 in 10,000 and 1 in 1,000,000, i.e., the estimated residential carcinogenic risk is 2 in 1,000,000 and the chronic hazard index is less than 1.

6.6 Grading and asphalt cover

LLNL graded and installed asphalt cover in accordance with a DTSC approved plan (see **Appendix S**). The grading and asphalt cover was designed by a Professional Engineer working for LLNL. After the excavated areas were filled with "clean" fill, LLNL graded the site and installed approximately 8 inch thick aggregate base material (see **Figure 6-9**).

Figure 6-9 Aggregate Base Covering the Project Site

After compacting the aggregate base layer, LLNL installed an asphalt layer (see **Figure 6-10**).

Figure 6-10 Asphalt Covering Over the Project Site

LLNL also replaced a well box that was damaged during the closure activities (see **Figure 6-11**).

Figure 6-11 Well Box Replacement

7.0 Waste Accumulation Areas

The entire B419 project site and Area 4100 were designated as Waste Accumulation Areas (WAAs) and were used to temporarily store waste. Area 4100 WAA is shown in **Figure 7-1**.

Figure 7-1 Area 4100 Waste Accumulation Area

In the WAAs, liquid hazardous, mixed and low-level wastes were stored in drums on secondary containment pallets (see **Figure 7-2**). Solid mixed wastes were stored in closed intermodal bins and bags that were covered using tarpaulin. The WAAs were operated in accordance with Title 22CCR Section 66262.34 . The WAAs were fenced, and signs and contingency plans were provided in accordance with the regulations.

Figure 7-2 Liquid Waste Storage at a WAA

8.0 Types of Waste Generated and Disposition

Table 11 lists the quantities of waste, the containers used to transport the waste, and the waste disposal facilities for each type of waste generated from the closure activities.

See **Appendix T** for hazardous, mixed and low-level waste shipping documents. Shipping documents are available for solid non-hazardous waste in hard copy, and are available upon request. All wastes were placed in appropriate Department of Transportation (DOT) approved containers.

The project had originally estimated that 50 cubic yards of soil would be removed. The subsequent soil sampling and analysis showed that approximately 500 cubic yards of soil needed to be removed and disposed. As a result, the DTSC supplemented its California Environmental Quality Act (CEQA) documentation originally prepared in 2009 by a Notice of Exemption (NOE) (see **Appendix U**). The NOE completed the CEQA documentation and outlined the requirements for removal of additional soil.

Table 11 Wastes Generated as a Result of the Closure Activities

Type of waste	Quantity	Container type	Size of Container	# of Containers	Treatment/ Disposal/ Destination Facility
Universal	333 lb	Drum	30 gal	1	AERC.com, Inc.
		Box	1 cu yard	1	
Liquid CA-Combined	401 gal	Drum	5 gal	1	Treated at DWTF
		Not Applicable	Not Applicable	Not Applicable	Treated at DWTF
Liquid Low-level Radioactive	1448 gal	Not Applicable	Not Applicable	Not Applicable	Treated at DWTF
Liquid Mixed	391 gal	Not Applicable	Not Applicable	Not Applicable	Treated at DWTF
Solid Hazardous	939 lb	Drum	55 gal	2	Clean Harbors of San Jose, LLC, and PSC Environmental Services
			5 gal	2	
Solid Low-level Radioactive	1,753,000 lb	Intermodal Bin	25 cu yard	15	Energy Solutions
		Drum	30 gal	3	
			55 gal	23	
		Intermodal Bin	25 cu yard	46	NNSS
		Transportainer	20 ft. × 8 ft. × 8 ft.	1	
		Metal Box	4 ft. x 4 ft. x 7 ft.	1	
		Drum	55 gal	15	

Type of waste	Quantity	Container type	Size of Container	# of Containers	Treatment/ Disposal/ Destination Facility
Solid Mixed	1,929,269 lb	Bags	2.4 cu yard	5	Energy Solutions
		Metal Box	4 ft. x 4 ft. x 7 ft.	12	
		Intermodal Bin	25 cu yard	55	
		Transportainer	20 ft. × 8 ft. × 8 ft.	1	
		Drum	55 gal	35	
		Steel Box	1.8 cu yard	3	
		Steel Box	4 ft. x 4 ft. x 7 ft.	1	NNSS
		Drum	55 gal	3	
		Drum	30	1	
		Bag	2.4 cu yard	118	
		Drum	55 gal	1	Stored at DWTF
		Metal Box	4 ft. x 4 ft. x 7 ft.	1	Stored at DWTF

The nonhazardous waste was also generated and consisted of materials used in conducting the closure activities that did not come in contact with the wastes, such as leaves and debris that blew into the project area. The nonhazardous waste was sent to Altamont Landfill using trucks. Waste from building materials, soil and concrete were characterized as listed in **Table 12**.

Table 12 Wastes Generation Categories by Location

Location	Mixed	Low-Level Radioactive	Universal Waste
Room 124 concrete walls and floor	--	X	--
Room 124 walk-in hood	X	--	--
Room 124 roof	--	X	--
Room 124 fixtures	--	X	--
Room 124 utility piping	--	X	--
Room 124 underground waste pipes	X	--	--
Room 124 footprint excavated soil	--	X	--
Room 155 concrete walls	X	--	--
Room 155 floor	--	X	--
Room 155 roof	X	--	--
Room 155 fixtures	X	--	--
Room 155 utility piping	X	--	--
Room 167 walls	X	--	--
Room 167 roof	X	--	--
Room 167 fixtures	X	--	X
Room 167 utility piping	X	--	--
Room 167 concrete floor	--	X	--
Room 167 walk-in hood and associated underground piping	X	--	--

Location	Mixed	Low-Level Radioactive	Universal Waste
Room 167 footprint excavated soil	X	--	--
Battery Shop walls and roof [1]	X	--	--
Battery Shop concrete floor [1]	--	X	--
Tank Vault concrete walls and floor	X	--	--
Tank Vault excavated soil	X	--	--
West and north yards concrete and asphalt	--	X	--
Utility rooms and office space structure	X	X	--

[1] The battery shop demolition activities were not part of the RCRA closure. Information included for completeness.

8.1 Liquid Hazardous, Radioactive, Mixed, and Nonhazardous Wastes

Because all wastes had been removed from the B419 facilities prior to commencement of the closure activities, the amount of liquid wastes generated was minimal. The hazardous, mixed and low-level liquid wastes were generated primarily as a result of decontamination and saw cutting operations. Nonhazardous liquid waste, including rainwater that was generated during the closure activities was handled at the Decontamination and Waste Treatment Facility; a LLNL RCRA permitted hazardous waste handling facility. Collected rainwater was handled in accordance with LLNL existing rainwater management procedures.

8.2 Solid Low-Level Radioactive and Mixed Waste

Solid low-level radioactive and mixed waste consisted primarily of soil, concrete and building materials debris.

The debris from concrete walls and floors was first processed for size reduction and removal of rebar before loading into intermodal bins. The intermodal bins were lined with bags before they were loaded with waste (see **Figures 8-1 and 8-2**).

Figure 8-1 Lining of an Intermodal Bin

Figure 8-2 Loading of a Lined Intermodal Bin

Solid mixed wastes were loaded into bags. **Figure 8-3** shows the mechanism for filling the 2.4 cubic yards bags.

Figure 8-3 Loading of a 2.4 Cubic Yard Bag

After the intermodals and bags were loaded, they were labeled, weighed and transferred to Area 4100 WAA for shipment, see **Figure 8-4**. During Phase I, the intermodals were transported by trucks to the Union Pacific Railroad Company in Oakland and shipped to Energy Solutions by rail. During Phase II, trucks were utilized for transportation activities. The majority of the waste in Phase II was shipped to NNSS, which does not have rail access.

Figure 8-4 Waste Containers Stored at Area 4100 WAA

Mixed waste, consisting of piping, fittings, rebar and other metal wastes were cut into sections, as necessary, and put into metal boxes for further handling, see **Figure 8-5**.

Figure 8-5 Metal Box for Storage of Solid Mixed Waste

8.3 Solid Nonhazardous, Nonradioactive Waste

The remaining solid wastes that did not come in contact with hazardous, mixed or low-level radioactive waste were characterized as nonhazardous waste and transported by end dump trucks to a local landfill. The tank vault cover, which was constructed of steel, was swiped for radioactive contamination and was recycled as scrap metal. This tank vault cover was a replacement added when the tanks and drain lines were removed.

9.0 References

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10.0 Acronyms

ASTM	American Society for Testing and Materials
B419	Building 419
CAS	Concrete-Asphalt-Soil
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CHHSL	California Human Health Screening levels
COC	Chain of custody
CSU	Container Storage Unit
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DTSC	California Department of Toxic Substances
DWTF	Decontamination and Waste Treatment Facility
EFA	Environmental Functional Area
EPA	U.S. Environmental Protection Agency
ES&H	Environment, Safety, and Health
ESL	Environmental Screening Levels
HHRA	Human Health Risk Assessment
LLNL	Lawrence Livermore National Laboratory
LLNS	Lawrence Livermore National Security
LLW	Low-level Radioactive Waste
MSDS	Material Safety Data Sheet
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
P.E.	Professional Engineer
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RHWM	Radioactive and Hazardous Waste Management Program
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SSO	Site Safety Officer

SSHP	Site Safety and Health Plan
STL	Severn Trent Laboratory
STLC	Soluble Threshold Leachate Concentration
TPH	Total Petroleum Hydrocarbons
TTLC	Total Threshold Limit Concentration
U.S.	United States
VOC	Volatile Organic Compound
WAA	Waste Accumulation Area
WAC	Waste Acceptance Criteria

Appendix A

Status of Building 419 RCRA Closure Project

National Nuclear Security Administration

Lawrence Livermore National Laboratory

April 27, 2011

Mr. Ryan Batty, Project Manager
Cleanup Program-Sacramento Office
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control
8800 Cal Center Drive, 2nd Floor
Sacramento, California 95826

Subject: **Status of the Building 419 RCRA Closure Project**
Lawrence Livermore National Laboratory
Livermore, California, (EPA ID No. CA2890012584)

Dear Mr. Batty:

During a teleconference held on March 8, 2011, the United States Department of Energy (DOE) and Lawrence Livermore National Laboratory (LLNL) provided you with an update on the status of the Building 419 RCRA Closure Project. DOE and LLNL are submitting this letter in order to provide you with formal written documentation that summarizes the information discussed during the teleconference.

As previously discussed, LLNL has completed the majority of the closure activities specified in the approved Closure Plan, including facility sampling and characterization, facility abatement, facility demolition, partial completion of the concrete, asphalt, and soil sampling campaign, and disposal of the facility structure and associated debris. The closure activities that remain to be completed consist of the subsurface sampling campaign required to establish project-specific metals and radiological background levels, the concrete, asphalt, and soil sampling campaign within the project area, and the sampling, characterization, and disposal of the facility concrete pad, underground piping, and associated concrete tank vault.

The closure schedule included in the March 2009 Final Closure Plan for Building 419 specifies that LLNL will complete all closure activities by July 21, 2011, and complete and submit the final Closure Report to DTSC by October 21, 2011, two years after the DTSC's October 21, 2009 approval of the Closure Plan. Due to the cost of the project being significantly higher than originally anticipated, no funds are currently available to complete the remaining two subsurface sampling campaigns or the sampling, characterization, and disposal of the facility concrete pad, underground piping, and associated concrete tank vault, by the completion date prescribed in the approved Closure Plan. DOE is requesting additional funds to continue the closure. In fiscal year 2012, DOE hopes to receive sufficient funding to enable LLNL to complete the remaining two subsurface sampling campaigns. DOE will continue to seek additional funding for the remaining closure actions, but does not anticipate receiving it until fiscal year 2013 or later.

In order to stabilize the Building 419 project site a fixative will be applied to the concrete pad to prevent any potential environmental releases. Regular inspections are continuing to take place to ensure that the site remains stable. However, all other closure activities have ceased until

additional funding can be obtained. Due to the uncertainty of receiving funding in future federal budgets, DOE and LLNL would like to schedule a meeting with DTSC to discuss potential options for moving the project forward.

If you have any questions regarding this submittal please contact Phil Wong of DOE at (925) 422-0765 or Bruce Schultz, LLNL Environmental Functional Area Manager, at (925) 423-3978.

Sincerely,

Reginald F. Gaylord
Acting Director, ES&H
Lawrence Livermore National Laboratory

Phillip E. Hill,
Technical Deputy
Department of Energy
National Nuclear Security Administration
Livermore Site Office

Cc:
Ghazi, Rizgar, DTSC, Sacramento Office
Steven Pay, DTSC, Sacramento Office

Linda S. Adams
Acting Secretary for
Environmental Protection

Department of Toxic Substances Control

Deborah O. Raphael, Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Edmund G. Brown Jr.
Governor

July 7, 2011

Mr. Bruce Schultz, Manager
Environmental Function Area
Lawrence Livermore National Laboratory
P.O. Box 808
Livermore, California 94551-0808

CLOSURE OF THE BUILDING 419 HAZARDOUS WASTE TREATMENT FACILITY AT THE LAWRENCE LIVERMORE NATIONAL LABORATORY, LIVERMORE, CALIFORNIA; EPA ID. NO. CA2890012584

Dear Mr. Schultz:

The Department of Toxic Substances Control (DTSC) is in receipt of two (2) recent letters regarding the closure of the Building 419 Hazardous Waste Treatment Facility at the Lawrence Livermore National Laboratory (LLNL), Livermore, California. The first letter, dated June 13, 2011, addressed the closure timeline and the second letter dated June 28, 2011, addressed the characterization of the building foundation. Building 419 was a Resource Conservation and Recovery Act interim status hazardous waste treatment facility.

In regards to the closure timeline, DTSC is aware that project costs have exceeded estimates and that the funding identified for closure activities proved insufficient. As a consequence, LLNL ceased work and was not able to complete all required activities within the 21-month period identified in the closure plan. The 21-month closure timeline approved by DTSC represented an extension beyond the 180-day closure requirement found in California Code of Regulations, title 22, section 66265.113.

While we are disappointed that the closure will not be completed on time, we are encouraged to learn that LLNL has identified additional funding to allow the sub-surface characterization activities to proceed. DTSC trusts that LLNL will continue to treat this project as a priority and will actively seek to obtain funding to complete implementation of the closure plan.

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Regarding the characterization of the building foundation, DTSC understood the approved closure plan to require discrete concrete sampling at each of the numbered locations described in Appendix A, Figure A-2 and Table A-8. However, we find the proposal to complete composite sampling of the concrete in place of discrete sampling to be a non-substantive change. Compositing is a common and accepted practice when characterizing waste for disposal purposes. DTSC has no objection to the change to the closure plan outlined in your letter and you may proceed accordingly. Please make note of this change to the closure plan in the closure certification report.

If you have any questions regarding this letter, please contact me at (916) 255-6424 or at rbatty@dtsc.ca.gov.

Sincerely,

Ryan W. Batty
Project Manager
Engineering and Special Projects Office

cc: Mr. Phillip E. Hill
Technical Deputy
Lawrence Livermore National Laboratory
P.O. Box 808
Livermore, California 94551-0808

Ms. Vicki Salvo
Environmental Function Area
Lawrence Livermore National Laboratory
P.O. Box 808
Livermore, California 94551-0808

cc (via email):

Mr. Rizgar Ghazi, P.E., Unit Chief
Engineering and Special Projects Office
Department of Toxic Substances Control
rghazi@dtsc.ca.gov

Appendix B

Request for Reduction in Concrete Sample Analysis

June 28, 2011

Mr. Ryan Batty, Project Manager
Cleanup Program-Sacramento Office
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, California 95826

Subject: *Lawrence Livermore National Laboratory's Request for a Reduction in Concrete Sample Analyses Associated with the Building 419 RCRA Closure Project*

Dear Mr. Batty:

As you know, additional funds have been allocated by Department of Energy (DOE) for the Building 419 RCRA Closure Project. With this additional funding, LLNL plans to resume the subsurface sampling campaigns. LLNL is submitting this letter to the Department of Toxic Substances Control (DTSC) to clarify our understanding of commitments in the approved Building 419 Final Closure Plan, dated March 2009, and to request confirmation to proceed with this approach in collecting and analyzing the concrete samples associated with the Concrete, Asphalt, and Soil (CAS) sampling campaign.

Section I.1 of the Final Closure Plan states that "...the concrete foundation will be evaluated for disposal and against the offsite facility's waste acceptance criteria." Section II then discusses collection of the concrete-asphalt-soil (CAS) samples collected at the soil-concrete interface and at specified incremental depths. While this could be read to require the concrete portion of each CAS sample to be analyzed separately from, and in addition to, the subsurface soil layers, it appears to us that concrete samples are to be analyzed to meet the waste disposal site requirements and then sampling of soil below the slab would start at the interface between the concrete and soil. LLNL would like to confirm this approach (i.e., the total number of concrete samples to be analyzed will enable LLNL to properly characterize the concrete pad and concrete tank vault, and ensure that the concrete meets the offsite disposal facility's waste acceptance criteria). Since the concrete pad and concrete tank vault are going to be removed and managed, at a minimum, as radioactive waste, LLNL proposes to collect a sufficient number of composite samples in order to properly characterize the concrete. Concrete samples from each CAS sample prescribed in the Closure Plan will still be collected, but instead of analyzing each concrete sample separately, one composite concrete sample from each room or discreet unit (e.g., tank vault) will be submitted for analyses. All subsurface soil samples will be acquired and analyzed as described in the Closure Plan.

LLNL believes that this approach in analyzing and characterizing the concrete waste will result in a significant cost savings for the project, while continuing to ensure that the RCRA requirements for properly characterizing and disposing of the concrete waste are maintained.

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If you have any questions or require additional information, please contact Vicki Salvo of my staff at (925) 423-5432.

Sincerely,

Bruce Schultz, Manager
Environmental Functional Area

Attachment: Figure A-2 of the B-419 Final Closure Plan Showing Independent Units From Where Each Composite Sample is Proposed to be Collected and Analyzed

Copy w/attachment (PDF):
Phil Wong (DOE/NNSA)
Ariel Robertson (DOE/NNSA)

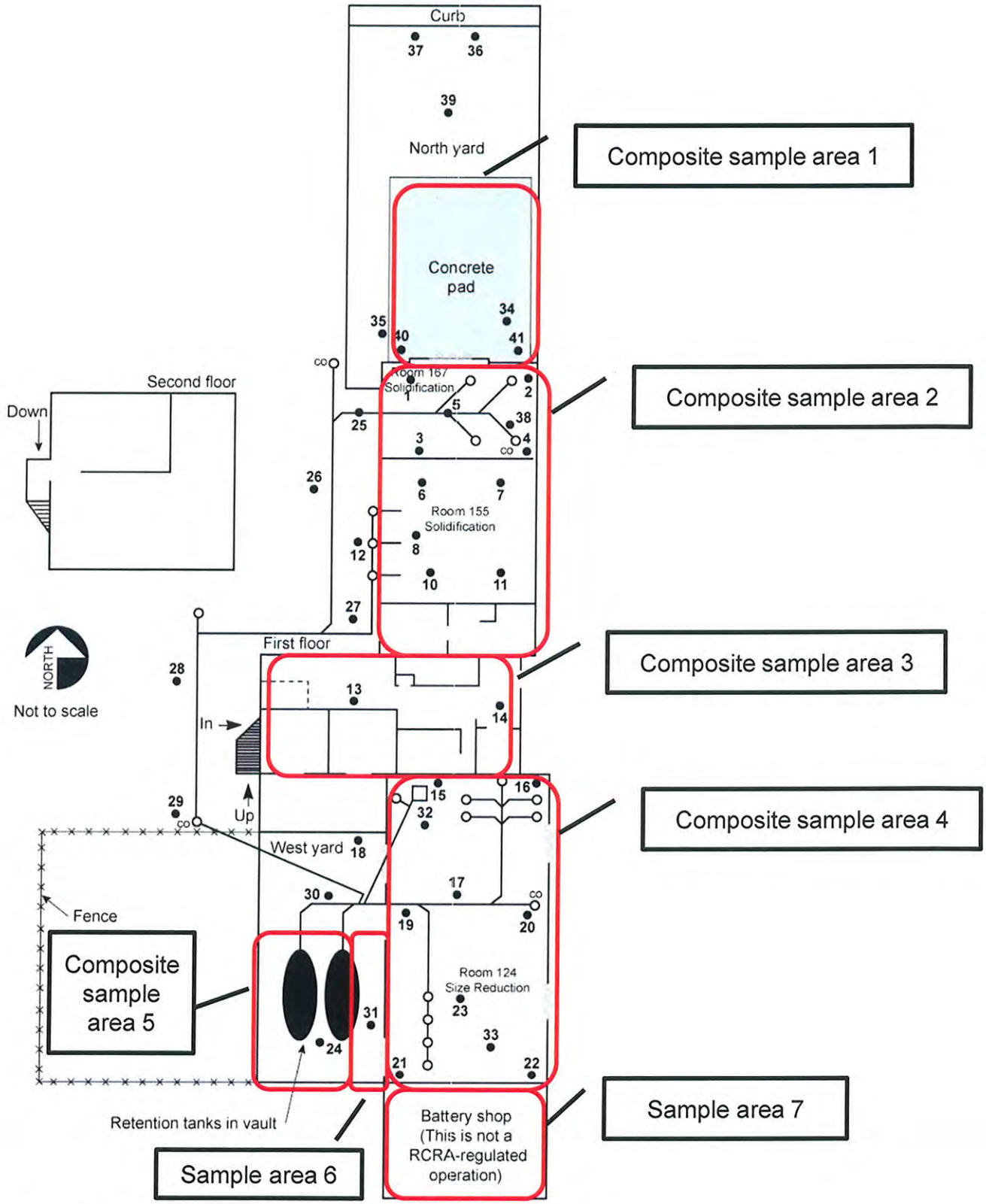

Figure A-2. Sample borehole locations at the B-419 Facility

Appendix C

DTSC Compliance Evaluation Report

CA EPA
DTSC

HAZARDOUS WASTE COMPLIANCE EVALUATION REPORT FOR LAWRENCE LIVERMORE NATIONAL LABORATORY

DTSC

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Deborah O. Raphael, Director
700 Heinz Avenue
Berkeley, California 94710-2721

Edmund G. Brown Jr.
Governor

August 12, 2011

FILE COPY

CERTIFIED MAIL

Mr. Bruce Schultz
Environmental Functional Area Manager
Lawrence Livermore National Laboratory
7000 East Avenue, L-626
Livermore, California 94551

Mr. Brian K. Perkins
RHWM Program Manager
Lawrence Livermore National Laboratory
7000 East Avenue, L-546
Livermore, California 94551

Dear Mr. Schultz and Mr. Perkins:

On April 28, and May 2, 2011, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) conducted the on-site portion of a Compliance Evaluation Inspection (CEI or inspection) at Lawrence Livermore National Laboratory (LLNL). The intent of the CEI was to evaluate compliance with hazardous waste control laws. The enclosed report describes the findings from the inspection.

After the on-site inspection DTSC issued a Summary of Observations to LLNL on May 3, 2011, noting that no violations of hazardous waste control laws had been discovered during the on-site inspection. Also, the Summary explained that compliance information was still under review and that violations may be determined after the site visit. The following violations, which are described in greater detail in the inspection report, were determined subsequent to the on-site portion of the CEI:

Major Violation –

1) **On or about June 28, 2011, LLNL violated Title 22, California Code of Regulations, section 66265.51(b) because it failed to implement provisions of its contingency plan for an unplanned release of storm water into the storm drain at the Building 419 closure site area.**

   According to Building 419's closure plan, LLNL is suppose to collect and contain any rain water that enters the closure area and pending analysis release or treat it.

   On or about June 28, 2010, Building 419's foundation was left uncovered and control measures in place at the time were not sufficient enough to contain rain water from a late season rainstorm. Uncontained, storm water estimated at 3,000-gallons and carrying waste constituents from the site flowed directly into LLNL's storm drain. LLNL did not implement its contingency plan for the release.

   Although LLNL did not implement its contingency plan, LLNL did, however, notify DTSC about the incident. It also collected and analyzed samples of the storm water.

   Corrective Action: LLNL shall fully implement its contingency plan for the release at Building 419 including completing required assessments and/or reports for the release.

Non-Minor Violation -

2) **On or about December 2010, and January 2011, LLNL violated California Health and Safety Code, section (HSC §) 25160(b)(3) since it did not include information on manifest records revealing that hazardous waste from Building 419 was transported by rail.**

   LLNL contractors containerized hazardous waste from the demolition of Building 419 and took it by truck to the Port of Oakland in December 2010 and January 2011. Visionary Solutions LLC was

hired by LLNL to truck the waste to the port. LLNL's manifest records for the shipments do not show that the waste was transported by rail from the Port of Oakland to the disposal facility in Utah. Visionary Solutions LLC is designated, incorrectly, as the sole transporter of the waste.

LLNL prepared hazardous waste manifest records, approximately sixty (60), for Building 419's waste shipments omitting information regarding the second hazardous waste transporter – the rail company.

Manifest instructions explicitly require hazardous waste generators (LLNL in this instance) to enter the company name and U.S. EPA ID number of any second transporter who transports waste (see appendix for Chapter 12 in Cal. Code Regs., tit. 22 – I. *Instructions For Generators*).

HSC § 25160(b)(3) states that the manifests *"shall contain the signatures of . . . all transporters, excepting intermediate rail transporters, and the out-of-state facility operator."*

The exception for "intermediate rail transporters" would not apply in this instance because the rail company here is the "initial" rail transporter.

You are required by section 25185(c)(3) of the Health and Safety Code to submit a written response to DTSC within 30-days describing the corrective actions that you have taken or propose to take to bring your facility into compliance. If you dispute any of the violations, you should explain your disagreement in this written response. The issuance of this letter does not preclude the DTSC from taking administrative, civil, or criminal action as a result of the violations noted in the report.

All pertinent information derived from the inspection including documents and photographs are included in the report.

This report will become a public document; you may request that any trade secret or facility security information be withheld from public disclosure. If you wish to assert the trade secret privilege after you have reviewed the report, please provide specific answers to each of the following questions, for each item, within 10-days of receipt of this letter:

1. To what extent is there knowledge of the information conveyed by the photograph/document outside your business ?

2. To what extent is there knowledge of the information conveyed by the photograph/document, by employees and others in your business ?

3. To what extent have measures been taken to guard the secrecy of the information ?

4. Is the information valuable to a competitor ? If so, why ?

5. Has there been substantial monetary expenditure in the development of the information ?

6. could the information be easily and properly acquired or duplicated by others ?

DTSC will review your responses to these questions to determine if the information should be treated as a trade secret and notify you of its decision.

If you have any questions regarding this letter, or if you wish to meet with DTSC to discuss any questions you have with the CEI, or the inspection report, please call me at (510) 540-3852.

Sincerely,

Mr. Richard Stewart
Senior Hazardous Substances Scientist
Enforcement and Emergency Response Program
Department of Toxic Substances Control

Enclosures

Certified Mail: 7008 2810 0000 2397 5709 Mr. Schultz
7008 2810 0000 2397 5716 Mr. Perkins

cc: Mr. Rick Robison
Supervising Hazardous Substances Scientist
Enforcement and Emergency Response Program
Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Department of Toxic Substances Control

Deborah O. Raphael, Director
700 Heinz Avenue
Berkeley, California 94710-2721

Edmund G. Brown Jr.
Governor

June 15, 2012

CERTIFIED MAIL

Mr. Bruce Schultz
Environmental Functional Area Manager
Lawrence Livermore National Laboratory
7000 East Avenue, L-626
Livermore, California 94551

Mr. Brian K. Perkins
RHWM Program Manager
Lawrence Livermore National Laboratory
7000 East Avenue, L-546
Livermore, California 94551

Mr. Schultz and Mr. Perkins:

As you know, in February representatives from the Department of Toxics Substances Control (DTSC) and Lawrence Livermore National Laboratory (LLNL) met and negotiated the terms of a Consent Order to resolve the two violations of hazardous waste control laws observed during DTSC's Comprehensive Evaluation Inspection at LLNL in April 2011. Those violations are associated with closure activities occurring at LLNL's Building 419. Since the February meeting between LLNL and DTSC, DTSC has determined an additional violation connected to Building 419.

The following Class I violation is added as an amendment to LLNL's 2011 CEI inspection report.

Major Violation –

On or about December 2010 through January 2011, LLNL violated California Health and Safety Code, section 25163(a)(1) since it transferred custody of a hazardous waste to a transporter who does not hold valid registration issued by DTSC.

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In approximately thirty (30) but no more than eighty (80) instances LLNL transferred hazardous demolition debris from Building 419 to agents and/or employees of the Greenfield Logistics Company. DTSC records reveal that the Greenfield Logistics Company is not registered, as required, to haul hazardous waste in California.

Despite the fact that most of the hazardous waste manifests for LLNL's Building 419 list the transporter as Visionary Solutions LLC, a registered hauler in California, DTSC has determined that Visionary Solutions LLC was not in fact involved with moving Building 419's waste off-site. Instead, DTSC believes and alleges that Greenfield Logistics, which is not a registered hazardous waste hauler, was responsible for hauling LLNL Building 419's waste. DTSC's investigation into this situation is ongoing but at this time, DTSC is adding this as a Class I Violation.

DTSC is willing to discuss resolving all three violations by consent order and payment of the associated penalty. Within 20 days from the date of this letter, please submit a written response to DTSC describing corrective actions that you have taken or propose to take to address the latest violation and bring your facility into compliance. If you dispute the above violation, please provide a written justification and any supporting documentation in your written response. The issuance of this letter does not preclude the DTSC from taking administrative, civil, or criminal action as a result of the violations noted in the 2011 CEI report as amended.

If you have any questions regarding this letter, or if you wish to meet with DTSC to discuss any questions you have please call me at (510) 540-3852.

I look forward to your response.

Sincerely,

Rick Robison for

Mr. Richard Stewart
Senior Hazardous Substances Scientist
Enforcement and Emergency Response Program

Certified Mail: 7010 2780 0000 8406 7912 Mr. Schultz
7010 2780 0000 8406 7929 Mr. Perkins

E-copies: Mr. Rick Robison, Supervising HSS
Enforcement and Emergency Response Program

September 9, 2011

Mr. Richard Stewart
Senior Hazardous Substances Scientist
Enforcement and Emergency Response Program
Department of Toxic Substances Control
700 Heinz Ave.
Berkeley, CA 94710-2721

Subject: *Response to Violations Issued by the Department of Toxic Substances Control to Lawrence Livermore National Laboratory, Main Site EPA ID: CA 2890012584*

Dear Mr. Stewart:

This letter is being submitted in response to the two violations issued by the Department of Toxic Substances Control (DTSC) associated with the 2011 Compliance Evaluation Inspection (CEI) at Lawrence Livermore National Laboratory (LLNL), conducted on April 28 and May 2, 2011.

Major Violation

"On or about June 28, 2011, LLNL violated Title 22, California Code of Regulations, section 66265.51(b) because it failed to implement provision of its contingency plan for an unplanned release of storm water from the storm drain at the Building 419 closure site area.

According to Building 419's closure plan, LLNL is suppose to collect and contain any rain water that enters the closure area and pending analysis release or treat it.

On or about June 28, 2010, Building 419's foundation was left uncovered and control measures in place at the time were not sufficient enough to contain rain water from a late season rainstorm. Uncontained, storm water estimated at 3,000-gallons and carrying waste constituents from the site flowed directly into LLNL's storm drain. LLNL did not implement its contingency plan for the release.

Although LLNL did not implement its contingency plan, LLNL did, however, notify DTSC about the incident. It also collected and analyzed samples of storm water.

Corrective Action: LLNL shall fully implement its contingency plan for the release at Building 419 including completing required assessments and/or reports for the release."

Response

Between the time the Building 419 RCRA closure activities began in 2010, and the time the storm water release occurred on June 28, 2011, LLNL took every precaution in order to prevent

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any run-off generated from closure activities from entering the soil and storm drain system. Rain water, equipment rinse water, and concrete cutting water generated from closure activities were contained, analyzed, and evaluated against the City of Livermore Water Reclamation Plant (LWRP) sewer discharge requirements and limits, as required by the approved Closure Plan, dated March 2009.

After the facility structure was demolished in December 2010, LLNL covered the remaining concrete pad with a plastic tarp until the rainy season was considered to be over. After the tarp was removed in order to resume closure activities in mid June, LLNL took further precautions to prevent radioactive contaminants identified on two areas of the concrete pad from entering nearby storm drains if a rainstorm were to occur, by applying a slurry seal to both areas. LLNL also cleaned the project area by removing leaves and debris that entered the project area and came in contact with the concrete pad during the rainy season, and placed absorbent "pigs" around the perimeter of the concrete pad where water would travel in the event of a small storm. LLNL considered these additional storm water control measures to be reasonable for June, the dry time of the year.

The storm in question was more severe and sudden than what is normally expected in Livermore during the dry season, and LLNL acknowledges that the storm water should have been contained and analyzed in order to demonstrate consistency with the Closure Plan requirements. However, LLNL personnel on the scene made the initial assessment that the storm would not likely pose a threat to human health or to the environment because (a) preventative measures were in place to keep the known contaminated areas sealed, and (b) any potentially high constituent concentrations were reduced within the large water volume stored in Lake Haussmann prior to discharge to the Arroyo Las Positas (see Attachment 1). Therefore, LLNL concluded that it was not required to implement its Contingency Plan as described in 22CCR, §66265.51(b). LLNL collected two storm water run-off samples at the project site on the day of the storm. The analytical results of the two storm water samples validated LLNL's initial conclusion made on the day of the storm, that the contaminants detected in the water did not present a threat to human health or to the environment. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) reportable quantity levels were not exceeded, and there were no human health or ecological impacts from the storm water that discharged from the Building 419 facility. A detailed assessment is included in Attachment 1.

LLNL did not prepare and submit a written report to the DTSC fifteen days after the storm occurred on June 28th since the Contingency Plan was not implemented. LLNL has prepared the report as part of this response, included as Attachment 1, in order to complete the corrective action requested in the inspection report. However, since the analytical results of the rain water collected on June 28, 2011 confirm that the release of the rainwater into the storm drain system did not present a threat to human health or to the environment, which are the conditions described in 22CCR, §66265.51(b) for implementation of the Contingency Plan, LLNL respectfully requests for DTSC to reclassify this violation as a minor violation.

Non-Minor Violation

"On or about December 2010, and January 2011, LLNL violated California Health and Safety Code, section (HSC§) 25160(b)(3) since it did not include information on manifest records revealing that hazardous waste from Building 419 was transported by rail.

LLNL contractors containerized hazardous waste from the demolitions of Building 419 and took it by truck to the Port of Oakland in December 2010 and January 2011. Visionary Solutions, LLC was hired by LLNL to truck the waste to the port. LLNL's manifest records for the shipments do not show that the waste was transported by rail for the Port of Oakland to the disposal facility in Utah. Visionary Solutions, LLC is designated, incorrectly, as the sole transporter of the waste.

LLNL prepared hazardous waste manifest records, approximately sixty (60), for Building 419's waste shipments omitting information regarding the second hazardous waste transporter – the rail company.

Manifest instructions explicitly require hazardous waste generators (LLNL in this instance) to enter the company name and U.S. EPA ID Number of any second transporter who transports waste (see appendix for Chapter 12 in Cal. Code Regs., tit. 22 – I. Instructions For Generators).

HSC § 25160(b)(3) states that the manifests "shall contain the signatures of ...all transporters, excepting intermediate rail transporters, and the out-of-state facility operator."

The exception for "intermediate rail transporters" would not apply in this instance because the rail company here is the "initial" rail transporter.

Response

LLNL acknowledges that the generator of the waste (LLNL) should have provided the second transporter's name and EPA ID Number, which are Union Pacific of Omaha, Nebraska and NED001792910, respectively, on each manifest prepared for the shipments of wastes from the Building 419 project, as included in Section I of the appendix in 22CCR, Chapter 12, titled, "Uniform Hazardous Waste Manifest, Continuation Sheet and Instructions". It is LLNL's understanding, however, that it is the responsibility of the initial transporter (in this case, an outside subcontractor), to ensure that the second transporter signs the manifest before the waste is relinquished by the initial transporter and the responsibility is officially transferred to the second transporter.

LLNL has reviewed the examples of Class I violations listed in Attachment B of DTSC's Enforcement Response Policy (Policy No. DTSC-OP-0006), and LLNL believes that the omission of information on a manifest would not fall under the Class I violation classification. Examples of violations listed as Class I violations in this Policy with respect to transportation of hazardous wastes include a failure to manifest hazardous waste, use of an unregistered hazardous waste transporter, and treatment, storage, or disposal at an unauthorized point. Therefore, LLNL is requesting DTSC to consider reclassifying this violation to a minor violation.

Please contact Sav Mancieri, Environmental Support and Programmatic Outreach Group Leader, at (925) 422-6920 if you have any questions.

Sincerely,

Bruce Schultz, Manager
Environmental Functional Area

Attachment: Incident Report for the Storm Water Release from the Building 419 Project Site on June 28, 2011

Copy (PDF):
Batty, Ryan (DTSC/Sacramento Office)
Gaylord, Reginald (ES&H Manager)
Kao, Wen (DOE/LSO)
Kong, Robert (DOE/LSO)
Wong, Phil (DOE/LSO)

Attachment 1

Incident Report for the Storm Water Release from

the Building 419 Project Site on June 28, 2011

Incident Report for the Storm Water Release from the Building 419 Project Site on June 28, 2011

Owner:	Operator:
U.S. Department of Energy P.O. Box 808 Livermore, California 94551 (925) 422-9919	Lawrence Livermore National Security, LLC 7000 East Avenue Livermore, California 94551 (925) 422-9919

Summary of Incident:

On Tuesday, June 28, 2011 at approximately 2:30 P.M. (PST), an unusual June storm produced about 0.64 inches of rainfall, generating run-off from the concrete slab that had been uncovered in order to resume sampling activities associated with the Building 419 RCRA closure project. The run-off was not contained and flowed into nearby storm drains. LLNL collected samples from locations where run-off was observed on the southwest and southeast sides of the project area, just outside of the galvanized perimeter fence constructed for the Building 419 project work site. The analytical results showed the detection of the following constituents: cyanide, arsenic, cadmium, chromium, copper, lead, and zinc, as included in a summary table submitted to DTSC on July 22, 2011.

No material was recovered, and no injuries occurred as a result of the run-off into the storm drain system. LLNL provided the State Water Resources Control Board (SWRCB) with verbal and written notification of this incident and LLNL provided the DTSC with verbal notification of this incident.

Assessment of Impact to Human Health and to the Environment:

In order to assess the potential threat to human health or the environment from the precipitation that came into contact with the concrete pad at the former Building 419, LLNL performed an analysis of the total contribution of the run-off water to water quality constituents in the receiving water, the Arroyo Las Positas. The total area of the Building 419 pad was estimated to be 0.148 acres and the area of the contributing sub-watershed approximately 40 acres. Using these areas, the total precipitation, and run-off curve numbers from the Natural Resources Conservation Service we are able to estimate the total volume of run-off that occurred from the pad and the total sub-watershed area. In addition, the sub-watershed that contains the former Building 419 discharges into an artificial lake on-site, Lake Haussmann, which retains more than nine million gallons of water. The estimated water volumes from the Building 419 pad, the sub-watershed, and Lake Haussmann were compared to determine the relative contribution of each to storm water quality.

These run-off volumes were used in combination with the measured constituent concentrations in samples collected from run-off leaving the former Building 419 area on June 28, 2011. LLNL was then able to assess potential changes in water quality and compare estimated results to standard water quality criteria including: EPA Benchmark Parameters, drinking water Maximum Contaminant Levels (MCLs), and EPA Ambient Water Quality Criteria (AWQC) for one hour maximum exposure values. Based on this analysis, it is LLNL's conclusion that there were no potential threats to human health or the environment.

The total rainfall on June 28, 2011 at the Livermore site using our site-specific rain gage was 0.64 inches. Using this rainfall total, the discharge volume of the Building 419 pad was estimated to be 2,572 gallons of run-off, which was rounded up to 2,600 gallons when reported to the State Water Resources Control Board (SWRCB) on July 15, 2011. This is slightly less than the 3,000 gallons stated in the letter to Bruce Schultz and Brian Perkins from Richard Stewart at DTSC dated August 12, 2011. A summary of the sampling results was also provided to the SWRCB by email at that time. The volume of run-off generated in the sub-watershed was approximately 625,635 gallons, so the discharge from the Building 419 pad was about 0.4% of the sub-watershed discharge. Similarly, the Building 419 pad run-off would account for about 0.03% of the total water in Lake Haussmann.

Using these relative contributions of the run-off sources, discharge concentrations were estimated at the discharge from the sub-watershed into Lake Haussmann and also at the discharge from Lake Haussmann into the Arroyo Las Positas. The ambient storm water quality was based upon data from the most recent storm water samples collected at the Arroyo Las Positas outfall location at the LLNL Livermore Site. Conservative assumptions were used in estimating these concentrations including:

- 100% of the rainfall onto the Building 419 pad was assumed to run off,
- A lower run-off curve number for the contributing sub-watershed was selected,
- Additional run-off water volumes flowing into the Lake and contributing to the run-off prior to discharge into the Arroyo Las Positas were ignored,
- If more than one data result existed for a constituent the higher value was used, and
- All data at the detection limit (DL) were employed at the DL concentration even though results would be expected to be lower.

The EPA AWQC were selected as an indicator for ecological impact. Estimated run-off concentrations entering Lake Haussmann exceeded the AWQC only for copper and zinc. Neither the estimated lead nor arsenic values exceeded the AWQC. The estimated copper value however, was below the EPA Benchmark Parameter indicating that this result would not generally be considered a storm water quality issue. In addition, the estimated copper value in the Lake discharge was below the AWQC, so by the time run-off reached the Arroyo Las Positas no impact would be expected. The estimated zinc value also exceeded the EPA Benchmark Parameter, however, zinc is a common storm water constituent that is elevated near galvanized materials. The sampling locations were unfortunately directly beneath galvanized fencing around the site parameter. At the same time, the estimated zinc result was below drinking water MCLs. Also at the point of discharge from the Lake, the estimated zinc value was below the AWQC indicating no impact at the Arroyo Las Positas.

Although the Arroyo Las Positas is not a direct water source for any drinking water system, drinking water MCLs were selected as an indicator for potential impacts to human health. None of the estimated water quality values exceeded an MCL at the discharge from Lake Haussmann. Therefore, it is unlikely that these discharge concentrations pose any threat to human health.

The analysis discussed demonstrates that the constituent concentrations measured in run-off samples collected from the former Building 419 area on June 28, 2011 were unlikely to pose a potential threat to human health or the environment.

July 3, 2012

Mr. Richard Stewart
Senior Hazardous Substances Scientist
Enforcement and Emergency Response Program
Department of Toxic Substances Control
700 Heinz Ave.
Berkeley, CA 94710-2721

Subject: *Response to Class I Violation Issued by the Department of Toxic Substances Control to Lawrence Livermore National Laboratory, Main Site EPA ID: CA 2890012584*

Dear Mr. Stewart:

This letter is being submitted in response to a recent Class I violation issued by the Department of Toxic Substances Control (DTSC) associated with the 2011 Compliance Evaluation Inspection (CEI) at Lawrence Livermore National Laboratory (LLNL), conducted on April 28 and May 2, 2011.

Class I Violation

"On or about December 2010 through January 2011, LLNL violated California Health and Safety Code, section 25163(a)(1) since it transferred custody of a hazardous waste to a transporter who does not hold a valid registration issued by DTSC.

In approximately thirty (30) but no more than eighty (80) instances LLNL transferred hazardous demolition debris from Building 419 to agents and/or employees of the Greenfield Logistics Company. DTSC records reveal that the Greenfield Logistics Company is not registered, as required, to haul hazardous waste in California."

Response

LLNL has researched this issue and is disputing DTSC's allegation that custody of hazardous waste generated by Building 419 Closure Project activities had been given to a transportation company (Greenfield Logistics) that does not hold a valid registration issued by DTSC. LLNL hired Greenfield Logistics because they could provide multiple services such as providing containers/liners, providing waste management quality control, and coordinating the logistics for waste transfer/transportation activities. Greenfield Logistics did not transport the waste. In addition, LLNL never contracted with, or expected Greenfield Logistics to take custody of any hazardous waste. LLNL does not have any evidence to believe Greenfield Logistics ever took such custody. Greenfield Logistics hired Visionary Solutions to transport the waste because Visionary Solutions holds a valid registration issued by DTSC. Visionary Solutions transported the waste by truck from the LLNL Main Site directly to Energy Solutions, LLC disposal facility

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in Clive, Utah, or initially by truck from the LLNL Main Site to the Port of Oakland where Visionary Solutions transferred custody of the waste to Union Pacific Railroad before the waste arrived at Energy Solutions, LLC. A copy of the Trip Lease Agreement between Greenfield Logistics and Visionary Solutions is included as **Attachment 1**, and a copy of Visionary Solutions' Hazardous Waste Transporter Registration is included as **Attachment 2**.

LLNL has also provided copies of each Traffic Management Secondary Oversight Hazardous Material Shipping Checklist, included as **Attachment 3**, completed by LLNL's Traffic Office for every truckload of Building 419 waste shipped offsite by Visionary Solutions. Each checklist identifies Visionary Solutions as the transporter of the waste.

LLNL has performed extensive research into this issue, and has not found any information or documentation that supports DTSC's allegation that LLNL transferred custody of hazardous waste to a transporter that does not hold a valid registration issued by DTSC. LLNL respectfully requests documentation of the alleged violation in order to fully understand DTSC's legal basis for issuing the alleged Class 1 violation. Based on the LLNL's research into this issue and documentation provided in this letter, LLNL is requesting DTSC to rescind this Class 1 violation.

Please contact Sav Mancieri, Environmental Support and Programmatic Outreach Group Leader, at (925) 422-6920 if you have any questions.

Sincerely,

Bruce Schultz, Manager
Environmental Functional Area

Attachments:
1. Trip Lease Agreement between Greenfield Logistics and Visionary Solutions
2. Visionary Solutions' Hazardous Waste Transporter Registration
3. Traffic Management Secondary Oversight Hazardous Material Shipping Checklists

Copy (PDF):
Alston, Frances (ES&H Manager)
Gaylord, Reginald (Deputy ES&H Manager)
Kao, Wen (DOE/LSO)
Kong, Robert (DOE/LSO)
Wong, Phil (DOE/LSO)

Attachment 1

Trip Lease Agreement between Greenfield Logistics and Visionary Solutions

§378.42

TRIP LEASE AGREEMENT (for less than 30 days)

THIS AGREEMENT, made in triplicate this _____ day of _____, year _____ between

	Name	Address	City	State	Zip
LESSEE	VISIONARY SOLUTIONS LLC	111 UNIVERSITY RD. STE B	OAK RIDGE	TN	37830
LESSOR	GREENFIELD LOGISTICS	1224 S. RIVER RD	ST. GEORGE	UT	84790

IN WITNESS HEREOF, it is mutually understood and agreed on this date that LESSOR does lease, let and hire to LESSEE and LESSEE does hereby rent and rent from LESSOR the motor vehicle equipment hereinafter described in consideration of and subject to all the terms and conditions hereinafter provided, including all provisions on the reverse side hereof.

Name or trade name of MOTOR CARRIER OPERATING EQUIPMENT VISIONARY SOLUTIONS LLC

US DOT number of LESSEE OF EQUIPMENT, if any 1021543 ICC MC number of LESSEE OF EQUIPMENT, if any 422210

Equipment	Year	Make	Serial No.	License No.	State
Tractor	1999	Kenworth	1XKWDB9X5XR2[illegible]108	149413	UT
Trailer					

LESSEE SHALL PAY LESSOR FOR EQUIPMENT as follows: _____% of gross revenues; _____ cents per mile for _____ total miles; (other method of compensation used) per week which ☑ does ☐ does not include driver services for the following trip:

From City & State Livermore, CA Date & Time 11/19/10 To City & State Dallas, GA & Cline, UT Date & Time _____

In consideration of foregoing, LESSEE agrees to pay within fifteen (15) days following return to it by LESSOR acceptable receipt evidencing clear delivery of property transported, driver logs, inspections and all required State and Federal documents and (other) _____

The following insurance is provided by LESSEE: ☑ liability ☑ property ☑ cargo ☐ bobtail ☐ other _____

If LESSOR is to be charged by LESSEE for any of the above coverage, state amount in dollars and cents $ _____

Escrow Funds: LESSOR ☐ is ☑ is not required to have an escrow fund or performance bond.

Should LESSEE require an escrow fund or performance bond, state amount required: $ _____ and prepare documentation as explained on reverse side of lease and attach to all three copies of this lease.

The responsibility for loading and unloading shall be: ☐ LESSEE ☑ LESSOR; if lessor, LESSOR shall be paid $ N/A

RESPONSIBILITY OF EACH PARTY WITH RESPECT TO: (check applicable section)

Party	Cost of Fuel	Fuel/Mileage Taxes	Empty Mileage	Oversize Permits	Fuel/Mileage Permits	PSC Type Permits	Tolls/ Ferries	Detention & Accessorial Services	Base Plates & Licenses
LESSEE									
LESSOR	✓	✓	✓	✓	✓	✓	✓	✓	✓

With regard to any unused portions of above stated items LESSEE ☐ will ☐ will not reimburse LESSOR except as follows _____

CHARGE BACK (items to be deducted) _____

Method of Computation _____

NO. 1 DRIVER'S NAME Michael Hunter Address 4119 Red Orchard Way West Jordan, Ut 84084

Log Record	1	2	3	4	5	6	7
Daily Total Lines 3 & 4							
Running Total							

Social Security No. 517-94-4217

Driver's License No. 172308378

State in which licensed Utah License expires 09/19/2013

Relieved of Duty at _____ a.m. p.m. _____ month _____ day _____ year

I certify that the above driver's license is the only one I hold and that this license is not suspended, revoked, or cancelled and that I am not disqualified under the Federal Motor Carrier Safety Regulations.

My physical and qualification card expires on 11/15/2011

I currently am enrolled in a drug and alcohol testing program that complies with 49 CFR part 382, and my test results are on file at Intermountain Murray WorkMed

DRIVER'S SIGNATURE Michael Hunter

NO. 2 DRIVER'S NAME _____ Address _____

Log Record	1	2	3	4	5	6	7
Daily Total Lines 3 & 4							
Running Total							

Social Security No. _____

Driver's License No. _____

State in which licensed _____ License expires _____

Relieved of Duty at _____ a.m. p.m. _____ month _____ day _____ year

I certify that the above driver's license is the only one I hold and that this license is not suspended, revoked, or cancelled and that I am not disqualified under the Federal Motor Carrier Safety Regulations.

My physical and qualification certificates expire on _____

I currently am enrolled in a drug and alcohol testing program that complies with 49 CFR part 382, and my test results are on file at _____

DRIVER'S SIGNATURE _____

TRACTOR INSPECTION	Not Defective	Defective	Date Corrected	TRACTOR INSPECTION	Not Defective	Defective	Date Corrected	TRACTOR INSPECTION	Not Defective	Defective	Date Corrected	TRACTOR INSPECTION	Not Defective	Defective	Date Corrected
Air Compressor	X			Dashboard	X			Mirrors	X			Thermometer	X		
Air Lines	X			Drive Line	X			Muffler	X			Tires	X		
Battery	X			Engine	X			Oil Pressure	X			Tire Chains	X		
Body	X			Front Wheels	X			Radiator	X			Transmission	X		
Brake Accessories	X			Front Axle	X			Rear End	X			Wheels - Rims	X		
Service Brakes	X			Fuel Tanks	X			Reflectors	X			Windows	X		
Parking (Hand)	X			Governor	X			Safety Equipment	X			Windshield Wipers	X		
Brakes	X			Heater	X			Springs	X			Drive Shaft Protection	X		
Carburetor	X			Horn	X			Starter	X						
Clutch	X			Lights	X			Steering	X						

TRAILER INSPECTION	Not Defective	Defective	Date Corrected	TRAILER INSPECTION	Not Defective	Defective	Date Corrected	TRAILER INSPECTION	Not Defective	Defective	Date Corrected	TRAILER INSPECTION	Not Defective	Defective	Date Corrected
Brake Connections	X			Coupling Device	X			Lights - All	X			Tires	X		
Doors	X			Doors	X			Roof	X			Wheels - Rims	X		
Hitch	X			Hitch	X			Springs	X			Other	X		
Coupling Chains	X			Landing Gear	X			Tarpaulin	X						

Remarks _____

I hereby certify that on the below date, I carefully inspected the above and this is a true and correct report of the result of such inspection.

Signature of person making inspection Michael Hunter Date _____

BEFORE SIGNING, READ BOTH SIDES OF THIS FORM.

This lease contains the following attachments (name them; if none, state none): Trailer agreement

In witness hereof the parties hereto have caused this agreement to be executed by their duly authorized agents the day and year first written above.

LESSEE SIGNATURE _____ LESSOR SIGNATURE _____

Lease No.

LESSEE'S RECEIPT FOR LESSOR'S EQUIPMENT DESCRIBED ABOVE

I hereby certify that on _____, 2010 year, at _____ a.m. p.m. the above described equipment was placed into service of LESSEE and was received by _____

Placard No.

This section must be completed by LESSOR upon delivery. LESSOR'S RECEIPT FOR RETURN OF LEASED VEHICLE(S) FROM LESSEE

I hereby certify that on _____ year at _____ a.m. p.m. LESSEE's placards were removed and the equipment described in this lease was returned to LESSOR and was received by _____

Manifest No.

Distribution of copies: (1) White - to be retained by LESSEE. (2) Yellow - to be placed on the equipment. (3) Pink - to be furnished to LESSOR.

THE YELLOW COPY AND THE FOLLOWING MUST BE COMPLETED AND RETURNED TO LESSOR FOR SETTLEMENT BY LESSEE:

☐ Delivery Papers ☐ Placards ☐ Driver Logs ☐ Inspections ☐ State Papers ☐ Federal Papers ☐ Other _____

§376.42

TRIP LEASE AGREEMENT (for less than 30 days)

THIS AGREEMENT, made in triplicate this _____ day of _____, year _____ between

	Name	Address	City	State	Zip
LESSEE	VISIONARY SOLUTIONS LLC	131 UNIVERSITY RD. STE 8	OAK RIDGE	TN	37830
LESSOR	GREENFIELD LOGISTICS	1224 S. RIVER RD	ST. GEORGE	UT	84790

IN WITNESS HEREOF, it is mutually understood and agreed on this date that LESSOR does lease, let and hire to LESSEE and LESSEE does hire and rent from LESSOR the motor vehicle equipment hereinafter described in consideration of and subject to all the terms and conditions hereinafter provided, including all provisions on the reverse side hereof.

Name or trade name of MOTOR CARRIER OPERATING EQUIPMENT VISIONARY SOLUTIONS LLC

US DOT number of LESSEE OF EQUIPMENT, if any 1021543 ICC MC number of LESSEE OF EQUIPMENT, if any 422210

Equipment	Year	Make	Serial No.	License No.	State
Tractor	2003	Kenworth	1XKWDB9X83J384152	1286445	UT
Trailer					

LESSEE SHALL PAY LESSOR FOR EQUIPMENT as follows: _____% of gross revenues; _____ cents per mile for _____ total miles; (other method of compensation used) _____ which ☒ does ☐ does not include driver services for the following trip:

From City & State Lawrence, CA Date & Time 11/29/10 To City & State Oakland, CA + Clive, UT Date & Time _____

In consideration of foregoing, LESSEE agrees to pay within fifteen (15) days following return to it by LESSOR acceptable receipt evidencing clear delivery of property transported, driver logs, inspections and all required State and Federal documents and (other) _____

The following insurance is provided by LESSEE: ☒ liability ☒ property ☒ cargo ☐ bobtail ☐ other _____

If LESSOR is to be charged by LESSEE for any of the above coverage, state amount in dollars and cents $ _____

Escrow Funds: LESSOR ☐ is ☒ is not required to have an escrow fund or performance bond.

Should LESSEE require an escrow fund or performance bond, state amount required: $ _____ and prepare documentation as explained on reverse side of lease and attach to all three copies of this lease.

The responsibility for loading and unloading shall be: ☐ LESSEE ☒ LESSOR; if lessor, LESSOR shall be paid $ N/A

RESPONSIBILITY OF EACH PARTY WITH RESPECT TO: (check applicable section)

Party	Cost of Fuel	Fuel/Mileage Taxes	Empty Mileage	Oversize Permits	Fuel/Mileage Permits	PSC Type Permits	Tolls/ Ferries	Detention & Accessorial Services	Base Plates & Licenses
LESSEE									
LESSOR	✓	✓	✓	✓	✓	✓	✓	✓	✓

With regard to any unused portions of above stated items LESSEE ☐ will ☐ will not reimburse LESSOR except as follows _____

CHARGE BACK (items to be deducted) _____

Method of Computation _____

NO. 1 DRIVER'S NAME Warren Taylor Address 393 Tinney Hollow Lane, WA UT 84780

Log Record	1	2	3	4	5	6	7
Daily Total Lines 3 & 4							
Running Total							

Social Security No. 528-71-8575

Driver's License No. 151435875

State in which Licensed UT License expires 2-8-15

Relieved of Duty at _____ a.m. p.m. _____ month _____ day _____ year

I certify that the above driver's license is the only one I hold and that this license is not suspended, revoked, or cancelled and that I am not disqualified under the Federal Motor Carrier Safety Regulations.

My physical and qualification certificates expire on 11/3/2010.

I currently am enrolled in a drug and alcohol testing program that complies with 49 CFR part 382, and my test results are on file at _____

DRIVER'S SIGNATURE _____

NO. 2 DRIVER'S NAME _____ Address _____

Log Record	1	2	3	4	5	6	7
Daily Total Lines 3 & 4							
Running Total							

Social Security No. _____

Driver's License No. _____

State in which licensed _____ License expires _____

Relieved of Duty at _____ a.m. p.m. _____ month _____ day _____ year

I certify that the above driver's license is the only one I held and that this license is not suspended, revoked, or cancelled and that I am not disqualified under the Federal Motor Carrier Safety Regulations.

My physical and qualification certificates expire on _____.

I currently am enrolled in a drug and alcohol testing program that complies with 49 CFR part 382, and my test results are on file at _____

DRIVER'S SIGNATURE _____

TRACTOR INSPECTION	Not Defective	Defective	Date Corrected	TRACTOR INSPECTION	Not Defective	Defective	Date Corrected	TRACTOR INSPECTION	Not Defective	Defective	Date Corrected	TRACTOR INSPECTION	Not Defective	Defective	Date Corrected
Air Compressor	✓			Tachograph	✓			Mirrors	✓			Tachograph			
Air Lines	✓			Dash Lamp				Mudflaps	✓			Tires	✓		
Battery	✓			Engine	✓			Oil Pressure	✓			Tire Chains	✓		
Body	✓			Front Wheels	✓			Radiator				Transmission			
Brake Lightning	✓			Front Axle	✓			Rear End	✓			Wheels - Rims	✓		
Service Brakes	✓			Full Tanks	✓			Repairs	✓			Windows			
Parking (Hand)	✓			Governor	✓			Safety Equipment	✓			Windshield Wipers	✓		
Brakes	✓			Heater	✓			Springs							
Carburetor	✓			Horn	✓			Starter	✓			Dual Short Protection	✓		
Clutch	✓			Lights				Steering							

TRAILER INSPECTION	Not Defective	Defective	Date Corrected	TRAILER INSPECTION	Not Defective	Defective	Date Corrected	TRAILER INSPECTION	Not Defective	Defective	Date Corrected	TRAILER INSPECTION	Not Defective	Defective	Date Corrected
Brake Connections	✓			Coupling Device	✓			Lights - All	✓			Tire			
Brakes				Doors	✓			Roof				Wheels - Rims			
Coupling Chains	✓			Hitch	✓			Springs				Other			
				Landing Gear	✓			Tarpaulin							

Remarks: _____

I hereby certify that on the below date, I carefully inspected the above and this is a true and correct report of the result of such inspection.

Signature of person making inspection _____ Date _____

BEFORE SIGNING, READ BOTH SIDES OF THIS FORM.

This lease contains the following attachments (name them; if none, state none): Training document

In witness hereof the parties hereto have caused this agreement to be executed by their duly authorized agents the day and year first written above.

LESSEE SIGNATURE _____ LESSOR SIGNATURE _____

LESSEE'S RECEIPT FOR LESSOR'S EQUIPMENT DESCRIBED ABOVE

I hereby certify that on _____, _____ year, at _____ a.m. p.m. the above described equipment was placed into service of LESSEE and was received by _____

This section must be completed by LESSOR upon delivery. LESSOR'S RECEIPT FOR RETURN OF LEASED VEHICLE(S) FROM LESSEE

I hereby certify that on _____, _____ year, at _____ a.m. p.m. LESSEE's placards were removed and the equipment described in this lease was returned to LESSOR and was received by _____

Distribution of copies: (1) White - to be retained by LESSEE (2) Yellow - to be placed on the equipment (3) Pink - to be furnished to LESSOR.

THE YELLOW COPY AND THE FOLLOWING MUST BE COMPLETED AND RETURNED TO LESSOR FOR SETTLEMENT BY LESSEE:

☐ Delivery Papers ☐ Placards ☐ Driver Logs ☐ Inspections ☐ State Papers ☐ Federal Papers ☐ Other _____

Lease No.

Placard No.

Manifest No.

Attachment 2

Visionary Solutions' Hazardous Waste Transporter Registration

Registration Nbr Contains 5911

1 Records Listed.

Reg.	ExpDate	Transporter Name	Address	City		Zip	Phone
5911	2013/05/31	VISIONARY SOLUTIONS LLC	111 UNION VALLEY RD STE B	OAK RIDGE	TN	37830	865.482.8670

Attachment 3

Traffic Management Secondary Oversight Hazardous Material Shipping Checklists

Environmental Functional Area

Environmental Support and Programmatic Outreach

LLNL-MISC-625991

Traffic Management Secondary Oversight Hazardous Material Shipping Checklists

July 2012

V. Salvo

Lawrence Livermore National Laboratory

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143250

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: CA Exp. Date: 11/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached	✓	

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/10/10

REMARKS: _____

SIGNATURE: Ron Schnell

DATE: 12/3/10

Traffic Form 1, rev. 4 (5/07)

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143255, 143278

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTION LLC

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UTAH Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/10/10

REMARKS: _____

SIGNATURE: _____ DATE: 12/7/10

Traffic Form 1, rev. 4 (5/07)

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143255, 143278

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTION LLC

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UTAH Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/10/10

REMARKS: _____

SIGNATURE: _____ DATE: 12/7/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143335, 143437

Destination: CLINE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. S911 Exp. Date: S/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed		

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/10/10

REMARKS: _____

SIGNATURE: _____ DATE: 12/9/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143335, 143437

Destination: CLINE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed		

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/10/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/9/10

Traffic Form

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143442

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* (X) H (T)	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. S911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/10/10

REMARKS: _____

SIGNATURE: _____ DATE: 12/10/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143442 473

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/10/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/10/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143477

Destination: Grants pass UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* (X) H (T)	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/10/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/10/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-142990

Destination: Clive UT

Transporter: Visionary Solutions Inc

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: CA Exp. Date: 11/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/10/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/10/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143583, 143584

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/17/10

REMARKS: _____

SIGNATURE: Jon Schneid DATE: 12/13/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143583, 143584

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/17/10

REMARKS: _____

SIGNATURE: _____ DATE: 12/13/10

Traffic Form 1, rev. 4 (5/07)

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143586, 143587

Destination: CLIVE UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15		
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate		
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* (X) H (T)		

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/17/10

REMARKS: _____

SIGNATURE: _____ DATE: 12/13/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143588

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: VT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* (X) H (T)	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/17/10

REMARKS: _____

SIGNATURE: _____ DATE: 12/13/10

Traffic Form 1, rev. 4 (5/07)

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L- 143589

Destination: Clive UT

Transporter: Visocar Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/12/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/12/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143585

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		✓

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [illegible]

DATE 12/17/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/13/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143590

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. ~~5911~~ Exp. Date: 5/11	✓	

REMARKS: 5911

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/12/10

SIGNATURE: [signature] DATE: 12/12/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143586, 143587

Destination: CLIVE UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15		
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate		
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T		

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/17/10

REMARKS: _____

SIGNATURE: _____ DATE: 12/13/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143632 L-143613

Destination: Clive UT

Transporter: Visionary Solutions LLC

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		✓

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/2011	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME Tom S

DATE 12/14/10

REMARKS: _____

SIGNATURE: R W

DATE: 12/14/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143632 L-143613

Destination: Clive UT

Transporter: Visionary Solutions LLC

SHIPPING PAPERS	YES	NO
Shipping Document	✓	
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓	
Document Reviewed per Regulatory Requirements	✓	
Emergency Response Guide Info.	✓	
Emergency Contact Number	✓	
D.O.T. Exemption Number DOT-SP _____		✓
Shipping Certification (signed)	✓	

CONTAINERS	YES	NO
Container Damaged or Leaking		✓
Marked	✓	
Labeled		✓

DRIVERS	YES	NO
Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
Current Medical Examiner Certificate	✓	
Endorsements (circle appropriate)* (X) H (T)	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		✓

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/2011	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME Tom S

DATE 12/14/10

REMARKS: _____

SIGNATURE: R W

DATE: 12/14/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143626

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* (X) H (T)	✓	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		✓

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 2011	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/14/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/14/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143623

Destination: Clive UT

Transporter: Visionary Solutions LLC

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 2011	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/14/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/14/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143618

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 2011		

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/14/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/14/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143653 + L-143627

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	X		Container Damaged or Leaking		X
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	X		Marked	X	
Document Reviewed per Regulatory Requirements	X		Labeled		X
Emergency Response Guide Info.	X		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	X		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	X	
D.O.T. Exemption Number DOT-SP _____		X	Current Medical Examiner Certificate	X	
Shipping Certification (signed)	X		Endorsements (circle appropriate)* X H T	X	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		X

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	X	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	X	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	X	
Placards/Marking	X	
Load Secured	X	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	X	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/15/

REMARKS: _____

SIGNATURE: T. [illegible] DATE: 12/15/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143640 + L-143652

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	X		Container Damaged or Leaking		X
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	X		Marked	X	
Document Reviewed per Regulatory Requirements	X		Labeled		X
Emergency Response Guide Info.	X		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	X		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	X	
D.O.T. Exemption Number DOT-SP _____		X	Current Medical Examiner Certificate	X	
Shipping Certification (signed)	X		Endorsements (circle appropriate)* X H T	X	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		X

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	X	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	X	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	X	
Placards/Marking	X	
Load Secured	X	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	X	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/17/11

REMARKS: _____

SIGNATURE: T. [illegible] DATE: 12/15/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143640 + L-143652

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	X		Container Damaged or Leaking		X
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	X		Marked	X	
Document Reviewed per Regulatory Requirements	X		Labeled		X
Emergency Response Guide Info.	X		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	X		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	X	
D.O.T. Exemption Number DOT-SP _____		X	Current Medical Examiner Certificate	X	
Shipping Certification (signed)	X		Endorsements (circle appropriate)* X H T	X	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		X

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	X	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	X	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	X	
Placards/Marking	X	
Load Secured	X	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	X	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/17/11

REMARKS: _____

SIGNATURE: T. [illegible] DATE: 12/15/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143653 + L-143627

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	X		Container Damaged or Leaking		X
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	X		Marked	X	
Document Reviewed per Regulatory Requirements	X		Labeled		X
Emergency Response Guide Info.	X		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	X		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	X	
D.O.T. Exemption Number DOT-SP _____		X	Current Medical Examiner Certificate	X	
Shipping Certification (signed)	X		Endorsements (circle appropriate)* X H T	X	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		X

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	X	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	X	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	X	
Placards/Marking	X	
Load Secured	X	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	X	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/15/10

REMARKS: _____

SIGNATURE: T. [illegible] DATE: 12/15/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143656

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	X		Container Damaged or Leaking		X
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	X		Marked	X	
Document Reviewed per Regulatory Requirements	X		Labeled		X
Emergency Response Guide Info.	X		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	X		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	X	
D.O.T. Exemption Number DOT-SP _____		X	Current Medical Examiner Certificate	X	
Shipping Certification (signed)	X		Endorsements (circle appropriate)* X H T	X	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		X

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	X	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	X	
Placards/Marking	X	
Load Secured	X	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	X	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [illegible]

DATE 12/17/10

REMARKS: _____

SIGNATURE: T. [illegible] DATE: 12/15/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143682

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	X		Container Damaged or Leaking		X
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	X		Marked	X	
Document Reviewed per Regulatory Requirements	X		Labeled		X
Emergency Response Guide Info.	X		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	X		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	X	
D.O.T. Exemption Number DOT-SP _____		X	Current Medical Examiner Certificate	X	
Shipping Certification (signed)	X		Endorsements (circle appropriate)* X H T	X	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		X

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	X	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	X	
Placards/Marking	X	
Load Secured	X	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	X	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/16/10

REMARKS: _____

SIGNATURE: T. B DATE: 12/15/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143667

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	X		Container Damaged or Leaking		X
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	X		Marked	X	
Document Reviewed per Regulatory Requirements	X		Labeled		X
Emergency Response Guide Info.	X		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	X		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	X	
D.O.T. Exemption Number DOT-SP _____		X	Current Medical Examiner Certificate	X	
Shipping Certification (signed)	X		Endorsements (circle appropriate)* X H T	X	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		X

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	X	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	X	
Placards/Marking	X	
Load Secured	X	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	X	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/12/16

REMARKS: _____

SIGNATURE: T. [illegible] DATE: 12/15/16

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143695

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/16/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/16/10

Traffic Form 1, rev. 4 (5/07)

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143695

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* (X) H (T)	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/16/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/16/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143717

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME: [signature]

DATE: 12/10/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/10/10

Traffic Form 1

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143730

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	X		Container Damaged or Leaking		X
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	X		Marked	X	
Document Reviewed per Regulatory Requirements	X		Labeled		X
Emergency Response Guide Info.	X		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	X		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	X	
D.O.T. Exemption Number DOT-SP _____		X	Current Medical Examiner Certificate	X	
Shipping Certification (signed)	X		Endorsements (circle appropriate)* X H T	X	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		X

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	X	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	X	
Placards/Marking	X	
Load Secured	X	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	X	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/17/10

REMARKS: _____

SIGNATURE: T. [illegible] DATE: 12/16/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143069

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	X		Container Damaged or Leaking		X
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	X		Marked	X	
Document Reviewed per Regulatory Requirements	X		Labeled		X
Emergency Response Guide Info.	X		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	X		Valid Commercial Drivers License (CDL) State: CA Exp. Date: 11/13	X	
D.O.T. Exemption Number DOT-SP _____		X	Current Medical Examiner Certificate	X	
Shipping Certification (signed)	X		Endorsements (circle appropriate)* (X) H (T)	X	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		X

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	X	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	X	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	X	
Placards/Marking	X	
Load Secured	X	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	X	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [illegible]

DATE 12/17/10

REMARKS: _____

SIGNATURE: [illegible] DATE: 12/16/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: 2-143811

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME Tom

DATE 12/17/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/17/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143814

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

***DEFINITIONS**

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/17/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/17/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143837

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		✓

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11		

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 12/27/10

REMARKS: _____

SIGNATURE: _____ DATE: 12/21/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143010

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: CA Exp. Date: 11/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached	✓	

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/2011	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/21/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/21/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143878

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 4/14	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		✓

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/27/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/27/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143970

Destination: Clive UT

Transporter: Visionary Solutions

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled		✓
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		✓

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME [signature]

DATE 12/27/10

REMARKS: _____

SIGNATURE: [signature] DATE: 12/27/10

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143064, 143284, 143888

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 1/7/11

REMARKS: _____

SIGNATURE: Don Schneider DATE: 1/4/11

Traffic Form 1, rev. 4 (5/07)

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143064, 143284, 14388

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 1/7/11

REMARKS: _____

SIGNATURE: [signature] DATE: 1/4/11

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143913

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* (X) H (T)	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		✓

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 1/7/11

REMARKS: _____

SIGNATURE: Ron Schnei

DATE: 1/4/11

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division [ ]

Document Reference No.: L-143064, 143284, 14388

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 9/13	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver	✓	

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME _____

DATE 1/7/11

REMARKS: _____

SIGNATURE: Ron Schneider DATE: 1/4/11

TRAFFIC MANAGEMENT SECONDARY OVERSIGHT
HAZARDOUS MATERIAL SHIPPING CHECKLIST

ORIGINATOR OF SHIPMENT

Materials Management [ ]

Hazardous Waste Management [✓]

Materials Distribution Division

Document Reference No.: L-143964

Destination: CLIVE, UT

Transporter: VISIONARY SOLUTIONS

SHIPPING PAPERS	YES	NO	CONTAINERS	YES	NO
Shipping Document	✓		Container Damaged or Leaking		✓
Bill of Lading/Airwaybill, Manifest/Hazardous Waste Manifest	✓		Marked	✓	
Document Reviewed per Regulatory Requirements	✓		Labeled	✓	
Emergency Response Guide Info.	✓		**DRIVERS**	**YES**	**NO**
Emergency Contact Number	✓		Valid Commercial Drivers License (CDL) State: UT Exp. Date: 3/15	✓	
D.O.T. Exemption Number DOT-SP _____		✓	Current Medical Examiner Certificate	✓	
Shipping Certification (signed)	✓		Endorsements (circle appropriate)* X H T	✓	

*DEFINITIONS

X = Combination tank vehicle/hazardous materials or hazardous waste.
H = Hazardous material or hazardous waste
T = Double Trailers

ADDITIONAL SHIPPING PAPER REQUIREMENTS

EXPLOSIVES (CLASS/DIV. 1.1, 1.2, 1.3)

	YES	N/A
CHP 148 Record of Inspections		

LLNL TRANS. SECURITY PLAN

	YES	N/A
Carrier TSP Acknowlegement on file and appropriate LLNL TSP Appendix attached		✓

RADIOACTIVE MATERIAL SHIPMENTS

	YES	N/A
RAM/LSA Exclusive Use Instructions to Driver		

HAZARDOUS WASTE SHIPMENTS

	YES	NO
Hazardous Waste Hauler Registration No. 5911 Exp. Date: 5/11	✓	

VEHICLE

	YES	NO
Hazardous Materials load segregation accomplished per 49 CFR	✓	
Placards/Marking	✓	
Load Secured	✓	

NOTIFICATION

	YES	NO
LLNL Fire Dispatch fax notification confirmed	✓	

MATERIAL DISTRIBUTION - QA RECORDS

NAME: [illegible]

DATE: 1/7/11

REMARKS: _____

SIGNATURE: [illegible] DATE: 1/6/11

Environmental Functional Area, Lawrence Livermore National Laboratory
P.O. Box 808, L-627, Livermore, California 94551

Appendix D

Integrated Worksheet, Standard Operating Procedure, and Hazard Assessment and Control Form

Lawrence Livermore National Laboratory

June 14, 2010

Mr. Ryan Batty, Project Manager
Legacy Landfills and Corrective Action Office
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, CA 95826

Subject: *Submittal of the Building 419 Integration Work Sheet to the Department of Toxic Substances Control*

Dear Mr. Batty:

In the Technical Completeness Determination Letter for the Final Closure Plan for Building 419, dated June 3, 2009, you requested a copy of a contractor specific Health and Safety Plan prepared by the subcontractor retained by Lawrence Livermore National Laboratory (LLNL) to implement closure activities. Since that time, LLNL has informed the Department of Toxic Substances Control (DTSC) that the closure activities would instead be performed by internal resources. Therefore, LLNL has prepared the enclosed project specific Integration Work Sheet (IWS) that identifies the hazards associated with the closure activities and describes the health and safety controls that LLNL has established for each work activity.

If you have any questions or require additional information, please contact Vicki Salvo of my staff at (925) 423-5432.

Sincerely,

Gretchen Gallegos for

Bruce Schultz, Acting Department Head
Environmental Protection Department

Enclosure: Integration Work Sheet – B419 Decontamination and Disposition

Copy (PDF):
Wong, Phil (NNSA/LSO)
Wuthrich, Steve

PRAD10-136 / EPDAI09-189 – BS/VS:lh

Recycle
7600-61230

Environmental Protection Department
Permits and Regulatory Affairs Division

LLNL-MI-448778

Lawrence Livermore National Laboratory
Livermore Site

Submittal to DTSC of Supplemental Documents Associated with the Building 419 Closure Project

August 10, 2010

Vicki Salvo

Lawrence Livermore National Laboratory

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

July 29, 2010

Mr. Ryan Batty, Project Manager
Legacy Landfills and Corrective Action Office
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, California 95826

Subject: *Submittal to DTSC of Supplemental Documents Associated with the Building 419 Closure Project*

Dear Mr. Batty:

In response to written comments LLNL received from Department of Toxic Substances Control (DTSC) for the Building 419 (B-419) Closure Project Integration Work Sheet (IWS), and additional requests made during the June 28th teleconference between LLNL and DTSC, additional documents developed specifically for the B-419 Closure Project are being submitted.

The first enclosure contains a reformatted version of the B-419 Closure Project IWS that includes assigned tasks and project-specific training courses for individuals who have direct oversight or involvement in the abatement, deactivation, demolition and waste handling and packaging activities. Please note that the symbol "N" displayed in red font, printed beside certain training courses, indicates that notification has been given to LLNL personnel that they must complete that particular course in ninety days. As described during the previous teleconference, the IWS provides information to each worker about specific tasks; the hazards associated with each task; and environmental, safety, and health (ES&H) controls required for each task. Since an IWS has the capability to be sorted by subject (e.g., worker name, task, etc.) the electronic version can be used by multiple members of a project team throughout the course of a project.

Additional documents containing supplemental information that LLNL developed for this project are enclosed, and provide more specific information than the IWS. The Standard Operating Procedure (SOP), included as Enclosure 2 contains detailed descriptions of the work activities. The Hazards Control Assessment and Control (HAC) Forms, included as Enclosure 3, contain more specific information than the IWS about respiratory protection such as a description of the operation that requires respiratory protection, the names of personnel involved, the specific type of respirator required, specifics on exchange of the respirators/cartridges, and hazard assessment of potential concentrations of airborne contaminants. The B-419 Contingency Plan, included as Enclosure 4, has been updated to reflect current emergency response personnel and describes the procedures that must be followed in the event of an emergency at the facility. The last enclosure supplements the Contingency Plan by providing additional information about the contamination zones and transition areas established before the project activities began.

PRAD10-176; EPDAI10-164:VS:lgb

If you have any questions or require additional information, please contact Vicki Salvo of my staff at (925) 423-5432.

Sincerely,

Bruce Schultz, Acting Department Head
Environmental Protection Department

Enclosure 1 - Integration Work Sheet (IWS)
Enclosure 2 - Standard Operating Procedure (SOP)
Enclosure 3 - Hazards Assessment and Control (HAC) Forms
Enclosure 4 - Contingency Plan
Enclosure 5 - Drawing of Project Site Showing Transition Areas

Copy w/enclosures (PDF):

Bailey, Jennifer	(DTSC Associate Industrial Hygienist)
Wong, Phil	(DOE/NNSA)

Enclosure 1

IWS 15672

UNABRIDGED VERSION

IWS/SP #	WAL	IWS STATUS	DATE CREATED
15672 r17 [*Not Restricted*]	**C**	**APPROVED / IWS on 21-MAY-10**	**12-MAR-10**

TITLE
B419 Decontamination and Disposition

SCOPE OF WORK

Scope of Work:
The B419 D&D Project is to isolate and deactivate the electrical and mechanical utilities, remove industrial and radiological hazards, remove the remaining walk in decontamination booths and roof mounted systems; decontaminate to the point where the building can be demolished in open air, and/or fix contamination in place, followed by the removal and disposal of all building structures, foundations and materials, and restoration of the area to the surrounding nominal grade. All wastewater and materials used in any decontamination process will be collected, sampled, and analyzed for characterization purposes. The demolition will be accomplished with two phases. Phase I will include removal of the building down to the slab. Phase II will include removal of the footers, floor slabs, concrete pads, and soil within the demolition area including the concrete pit. The demolition area extends 25 feet from the building. Upon completion of the demolition, the area will be back filled and covered with a top layer of road base material.

General Project Execution Approach
This project involves the coordinated efforts of many groups and individuals, including: ERD-D&D; RHWM; ESH&Q; and MUSD . The overall management and control of the project is the responsibility of ERD-D&D, lead by the project manager and RI. All work will be covered by appropriate IWSs developed by the group performing the work task. The ES&H Team will prepare appropriate HACs which reference the work IWS and this IWS # 15672. Task hazards and controls will be covered in the individual work IWSs and the area hazards and controls will be covered by a facility work permit co-signed by the FPOC/PM and ES&H/IH. Multiple hazards with multiple controls may apply to the same area ind in those cases the most stringent shall apply. D&D roles and role specific training is identified in the attached training document.
This IWS will also establish the general access requirements applicable to all personnel who have a need to enter the project areas, and includes administrative steps; minimum training requirements; medical surveillance; PPE; and personal air monitoring as further described below. Minimum access requirements are listed in the Facility Hazard Section of this IWS and a project implementation map shall be posted in the project trailer.
Each work crew shall prepare a daily Pre-Task Hazard Analysis (PTHA) [or equilivant document as determined by the RI] which identifies the planned work tasks for that day, the hazards associated with the task and the hazard controls that will be applied during task performance. See the PTHA Procedure attached to this IWS for additional information.

Additional Project Information:
Several MUSD craft groups will also be supporting the project and using their own IWSs to control their work. This includes the Plumbers [14142], Carpenters [6], Riggers [414].AC Mechanics [19],
RHWM will be performing field techician services, waste sampling, and storage & disposal field operations and will be using their own IWSs to control their work. This includes: IWS 1266 - RHWM Field Technician Services; 1345 - Waste Sampling; and 14635 - Radiological Characterization Group Field Services.
ES&H personnel will be providing specific support in the areas of environmental safety and health and will be operating under their own IWSs. [IWS #s to follow]
This IWS will serve as the summary document used for subcontractor and support services oversight. The identification of training needs and hazards/controls associated with the work can be applied to the surveillance process LLNL individuals will conduct over the subcontractor's operations.
For emergency and off-hours point-of-contacts: , ES&H HCD, ; and Valerie Morrow, Project Manager, T4378-R1009, 2-9246, pager 51716.

AUTHORIZING ORGANIZATION

Operations and Business Principal Directorate • Facilities and Infrastructure • Environmental Restoration

TYPE OF IWS

LLNL

LOCATION OF THE ACTIVITY

1) LLNL - Bldg: 419 - Rooms: NA

Add'l Info: including adjacent corporation yards

Chemical Hygiene Program	Hazard Communication Program
N/A	✔

TASKS RELATED TO THE ACTIVITY

Title	Description
All Tasks	Hazards and controls identified in this section apply to all tasks listed in this IWS.
System Deactivation	The isolation (lock-out & tag-out) of electrical and mechanical systems prior to working on them. The re-routing and air gapping of the B419 Electrical and Mechanical Systems
Removal of Items	The removal of equipment, material and systems from B419
Decontamination	Decontaminate rooms, facility/utility systems and equipment in preparation for demolition and processing as waste.
Abatement	Removal of asbestos containing floor tiles and possibly other ACM including TSI. Removal, enclosure or encapsulation of degraded/chipped paint that may contain lead.
Building Demolition	Destruction of the building and reducing the debris to rubble. Separating the metal from the concrete and wood. Loading all the post demolition materials into waste disposal containers for transport.
Waste Pkg/Handling	The packaging and handling of the project waste including PPE, decontamination materials, and equipment, material and systems removed from B419.

MANAGEMENT CHAIN FOR THE ACTIVITY

Name	Title	Phone	Pager
MORROW, VALERIE L	RI	29246	51716
ALBERT, JOSEPH S	Alt RI	30149	00958
STEENHOVEN, JUDITH C	AI	38853	04265
YOW, JESSE L	Environmental Restoration Department Head	23521	--
CONNER, HAROLD T	Facilities & Infrastructure AD	25786	--
--	Operations and Business Principal Directorate	--	--

ATTACHED FILES

Type	Name	Links
Attached	HAC_B419_Sampling_2010_r4.pdf	HAC_B419_Sampling_2010_r4.pdf - [Download]
Attached	B-419 CP Salvo March '10.doc.Rev. 2x.pdf	B-419 CP Salvo March '10.doc.Rev. 2x.pdf - [Download]
Attached	B419PTHA Procedure.docx	B419PTHA Procedure.docx - [Download]
Attached	PRAD10-043 Updates to B419 Contingency Plan.pdf	PRAD10-043 Updates to B419 Contingency Plan.pdf - [Download]
Attached	B419ContinPln Appendices.VS March '10 Rev. 2.pdf	B419ContinPln Appendices.VS March '10 Rev. 2.pdf - [Download]
Attached	Attachment E.xls	Attachment E.xls - [Download]
Attached	Attachment A.doc	Attachment A.doc - [Download]
Attached	Attachment B.ppt	Attachment B.ppt - [Download]
Attached	B419_Clos PlanFinal.vol1.Mar2009-1.pdf	B419_Clos PlanFinal.vol1.Mar2009-1.pdf - [Download]
Attached	B419_Clos PlanFinal.vol1.Mar2009.pdf	B419_Clos PlanFinal.vol1.Mar2009.pdf - [Download]
Attached	SOP6.1_r2_rlg_final-gl.doc	SOP6.1_r2_rlg_final-gl.doc - [Download]
Attached	Attachment G.xls	Attachment G.xls - [Download]
Attached	ll-ob-2010-037046.pdf	ll-ob-2010-037046.pdf - [Download]
Attached	Attachment D.xls	Attachment D.xls - [Download]
Attached	Attachment C.pdf	Attachment C.pdf - [Download]
Attached	DD_MDP_0419_Rev_0-05-05-10.pdf	DD_MDP_0419_Rev_0-05-05-10.pdf - [Download]
Attached	DD_EDP_0419_Rev_0-05-05-10.pdf	DD_EDP_0419_Rev_0-05-05-10.pdf - [Download]
Attached	B419IWSD&D Trng chart.pdf	B419IWSD&D Trng chart.pdf - [Download]

Attached	HAC_Sitewide_Silica_ConSaw_JackHammer_July 10.pdf	HAC_Sitewide_Silica_ConSaw_JackHammer_July 10.pdf - [Download]
Attached	15672_asbestos_work_permit.pdf	15672_asbestos_work_permit.pdf - [Download]
Attached	Pb_Permit_B419_15672.pdf	Pb_Permit_B419_15672.pdf - [Download]
Attached	B419_HAC_15672_Pothole_07_01.pdf	B419_HAC_15672_Pothole_07_01.pdf - [Download]

REFERENCED FILES

Type	Name	Location
SCR	B419	Facility management
OTHER	ES&H Manual Document 14.4, Working Safely with Beryllium	https://esh-int.llnl.gov/man/14.4.pdf
OTHER	ES&H Manual Document 14.9, Safe Handling of Asbestos-Containing Material	https://esh-int.llnl.gov/man/14.9.pdf

GENERAL HAZARD CONTROL INFORMATION

The requirements and controls in: ERD SOP 6.1: Decontamination and Decommissionoing (D&D) Team - Standard Operating Procedure 001 - Rev 2: the ES&H Manual; any required HAC's; and this IWS will be followed on this project. A daily tailgate meeting will be conducted with workers to discuss the day's activities, safety concerns & controls and lessons learned. A PTHA will be completed each morning and reviewed during the tailgate. Unless specifically agreed upon by the RI, with concurrence from the ES&H Disciplines, all materials released will follow Release Protocol Level 2.

Waste items will have the necessary samples and surveys for characterization taken prior to being wrapped in plastic or placed into containers. This will eliminate the need to reopen packages to obtain samples. The ES&H Team Environmental Analyst will be consulted to determine appropriate sampling and surveying requirements.

HAZARD DESCRIPTIONS AND CONTROLS

All Tasks|TASK
Hazards and controls identified in this section apply to all tasks listed in this IWS.

Biological -Sharps/needles
Hazard Name
SHARPS, NEEDLES
Description
Sharps and needles may be present in and around equipment and other areas throughout the facility . The hazard is puncture of the skin and possible contamination to personnel.
Control
If sharps are found, place in a sharps container. Report to medical if personal injury with sharps has occurred. Do not put unprotected hands into areas that cannot be seen. Use of Kevlar or leather work gloves may help prevent punctures or cuts from sharps.

Biological -Other animals (wild, domestic, insects)
Hazard Name
OTHER ANIMALS (WILD, DOMESTIC, INSECTS)
Description
Rats, mice, spiders, wasps, bees, birds, ferel cats and other vermin may be present within the facility or trailers. MOLD may be present in areas where water damage has occurred.

Control
Visually inspect all suspect areas prior to entering or placing hands. If unwanted animals are identified, contact the gardening crew for removal assistance. If animal feces are encountered, contact the gardening crew for removal or have the ES&H Team generate a HAC and remove the droppings with D&D forces. If a bite/sting occurs, immediately seek medical attention, or contact 911 as appropriate. If live wild animals are encountered, contact the Lab Biologist for assistance. Avoid direct contact with visible mold. Contact ES&H Team Industrial Hygienist for futher guidance if activity will disturb visible mold.

Biological -Other biological
Hazard Name
OTHER BIOLOGICAL
Description
Exposure to bird and rodent droppings may expose workers to fungi, parasites, agents causing allergic reactions or viruses.
Control
All workers shall minimize exposure by preventing/avoiding direct contact whenever possible, using PPE (nitrile gloves at a minimum) when contact cannot be prevented, and practicing proper hygiene when tasks are complete.
Avoid direct contact with rodent droppings. If rodent droppings are encountered, contact the gardening crew for removal or have the ES&H Team generate a HAC and remove droppings with D&D forces.

Chemical (Hazardous Material) -Beryllium (Requires SP)
Hazard Name
BERYLLIUM
Description
Beryllium exists on the surfaces in the RCRA rooms of B419 based on previous characterization data. Inhalation of beryllium particulate can lead to sensitization and possibly Chronic Beryllium Disease. It has been postulated that dermal exposure to very small particulate can also lead to sensitization. Exposure routes include inhalation and dermal contact.
Control
Engineering Controls:
1. Disable building 419 ventilation system.
2. Physically isolate ventilation ducts within the RCRA rooms.
3. Install physical barriers where air may escape to adjacent rooms.
4. Construct a Hot-Warm 1-Warm 2-Cold zone in anticipation of Tyvek coverall breaches in the work zone. This will also serve as an area to provide a clean zone for donning employer issued work clothing and storage of personal items. The Hot zone must be at a negative pressure in relation to the Warm 1, which must be negative to Warm 2, which must be negative to Cold.
5. Set up air hog(s) as needed to maintain negative pressure in the work area with respect to adjacent rooms.
6. Use barriers or glovebag type enclosures to capture any loose contamination from duct work or other areas suspected of contamination.
7. Use sleeved accordion hot break technique for disassembly of contaminated lines, ducts, equipment, or filter assemblies.
8. HEPA Vacuum and wet wipes (commercially available) are utilized to perform decontamination. Other methods of surface contamination removal may be used, but the industrial hygienist must concur with the method prior to implementation.

Administrative Controls:
1. Provide a step-off pad prior to exiting all Beryllium Work Areas
2. Barricade work areas and post as Beryllium Work Areas per ES&H Manual Document 14.4 (CAUTION posting).
3. DOE DANGER label on all waste containers
4. Release swiping of Beryllium Work Areas prior to release to the facility
5. Personal air monitoring during performance of all tasks. Good work practices are essential to mitigate from beryllium being re-suspended from contaminated surfaces to create an airborne hazard. Each entrant is required to complete a B419 Personal Breathing Zone Air Monitoring Form for Total Beryllium. Each entrant into the work zone must wet wipe clean their personal air sampling pump if it was worn on the outside of the Tyvek coveralls within the work zone. The H&S Technician responsible for supporting D&D will swipe sample these air sampling pumps and ensure they are below the DOE release limit prior to bringing them to the Industrial Hygiene Instrument Laboratory.
6. Area air monitoring during performance of all tasks
7. Each entrant into the work zone is required to sign a logbook to track time-in, time-out and activity performed.
8. Each entrant into the work zone is required to shower at the end of the work shift if their Tyvek coveralls are breached within the work zone.
9. Each entrant into the work zone must have Project Manager approval prior to entry.
10. Wet wipe dust from surfaces to remove gross dirt prior to handling, disassembly or removal from walls, etc. Wet wipe perimeter/footprint of equipment or item prior to removal or any other movement (i.e., machine tools, cabinets, workbenches, etc.).
11. Release of Items/Equipment to Non-Beryllium Work Area: All items, equipment, etc., must be wrapped, bagged or otherwise encapsulated prior to removal from B419 .The exterior of the bag, wrapping or

encapsulating material must be swiped and results must be below the DOE release limit.
12. H&S Technician present at opening or break of ventilation or equipmentfor survey or exposure of potentially contaminated flooring.
13. General Particulate Decontamination Procedures: (a) Always work from areas of lowest to highest contamination Work from the outside to inside and higher to lower areas; (b) Use HEPA vacuum first to remove the larger amounts of dirt and follow-up with wet wiping; (c) Never dry sweep (use of Masslin mop is approved) or use compressed air to remove contamination; (d) Use decon gel or wet the wipe with cleaning solution. Try to avoid spraying a contaminated surface with a spray bottle; (e) If dipping wipes into a cleaning solution, do not re-dip contaminated wipes into the clean solution; (f) Each cleaning motion should be done with an unused portion of a wipe; (g) Do not use mechanical means of contamination removal; and (h) Change gloves frequently to avoid cross-contamination of cleaned surfaces.
PPE:
Personal clothing is not allowed in areas where decontamination and consolidation activities are being performed to mitigate surface beryllium contamination. Don and Doff PPE according to posted procedures. All PPE will be disposable except for respiratory protection.
1. Full-face APR or optional Full-face PAPR with P100/HEPA filter. Respiratory Protection is REQUIRED upon entry into the work area during all decontamination and consolidation activities.
2. Employer issued clothing (i.e., scrubs), when directed by the RI.
3. Full-body protective clothing (i.e., Tyvek coveralls or FR protective gear for zero voltage checks)
4. Hood, or similar (attached to coveralls)
5. Nitrile gloves (two pairs; first pair taped to coverall sleeves)
6. Safety shoes (i.e., ASTM F2413-05 approved)
7. Shoe covers (two pairs; first pair attached to coveralls)

Hazardous or Radioactive Materials & Equipment that Present a Hazard (SP Info)			
Item 1 · General Information **Type:** HAZARDOUS MATERIAL **Desc:** Beryllium contamination **Comment:**			
Use Location		**Storage Location**	
Qty · UOM	n/a ·	**Qty · UOM**	n/a ·
Loc Site · Fac · Rm · Addl Info	LLNL · 419 · NA · including adjacent corporation yards	**Loc Site · Fac**	LLNL · none · none ·

Chemical (Hazardous Material) -Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB) (Requires SP)
Hazard Name
ASBESTOS, LEAD, MERCURY, ZINC, SILICA
Description
Degraded lead containing paint or asbestos containing materials may be present in the building or on the equipment. Removal of equipment may involve disturbing paint and/or asbestos containing material. The facility roof may have Kiska which contains regulated metals. Demolition or disturbance of concrete or asphalt will create the potential for crystalline silica dust. The paint on the exterior of the facility may contain lead. Transite pipe may be encountered during utility disconnects. Removal of light tubes and ballasts that may contain mercury or PCBs is required. Mercury has been found in previous B419 decommissioning activities and may still be present.
Control
The rooms, labs, and equipment present in the facility shall be visually inspected and sampled for the presence of mercury, degraded lead containing paint and asbestos containing material prior to D&D activities. Gross paint debris and loose floor tiles will be cleaned up prior to working in specific areas. The worker shall minimize exposure by preventing direct contact whenever possible, using PPE and practicing proper hygiene when tasks are complete. A permit will be required prior to any abatement activities occurring.
Wet methods and respirators shall be utilized whenever concrete or asphalt is disturbed. The H&S Technician SHALL be notified if any mercury is visually detected. A HAC will be written and reviewed with workers. Contact cognizant IH/HP prior to concrete or asphalt disturbance.

Hazardous or Radioactive Materials & Equipment that Present a Hazard (SP Info)			
Item 1 · General Information **Type:** HAZARDOUS MATERIAL **Desc:** Asbestos,Lead/Mercury **Comment:**			
Use Location		**Storage Location**	
Qty · UOM	n/a ·	**Qty · UOM**	n/a ·
Loc Site · Fac · Rm · Addl	LLNL · 419 · NA · including adjacent	**Loc Site ·**	LLNL · none ·

Info	corporation yards	**Fac**	none ·

Construction/Equipment/Working Surfaces -Sharp edges/shears
Hazard Name
SHARP EDGES
Description
The decontamination/demolition efforts will be performed in areas and create numerous pinch points and sharp edges. Sharp edges may be present in and around equipment, material and systems being removed as a part of this project. The hazard is injury to the skin and possible contamination to workers.
Control
Be aware of the areas being decontaminated and possible pinch points and sharp edges. Report to medical if personal injury with sharp edges has occurred. Do not put unprotected hands into areas that cannot be seen. Use of Kevlar or leather work gloves may help prevent punctures or cuts from sharp edges.

Emergencies/Earthquakes/Fire -Unique fire safety issues
Hazard Name
UNIQUE FIRE SAFETY ISSUES
Description
Demolition work poses unique fire hazards in that the various building fire protection systems could be rendered inoperative while at the same time additional combustibles could be introduced into the structure.
Control
All smoke detectors, heat detectors, and other automatic fire alarms along with emergency lights, fire doors, fire exits, and exit signage shall be kept in service until the building access is limited to authorized personnel only. Automatic fire sprinkler fire riser flow alarm systems shall be kept in service until immediately prior to demolition.

Combustible materials generated in the course of the work (used PPE, packaging materials, scrap wood, etc.) shall be removed from the structure in a timely manner so as to avoid creating additional fire loading. Flammable liquids needed for work should be minimized and stored in UL listed flammable liquids cabinets

Pressure/Noise/Hazardous Atmospheres -Noise (>85 dB) (Requires SP)
Hazard Name
NOISE (>85 DB)
Description
D&D activities frequently result in noise levels above 85 dBA. Prolonged exposure to high noise levels (above 85 dBA) may result in permanent hearing loss.
Control
All applicable controls stated in Document 18.6 "Hearing Conservation" of the ES&H Manual shall be followed. Personnel in areas where they are exposed to noise levels in excess of the ACGIH TWA TLV of 85 dBA for over 8 hours shall be enrolled in a Hearing Conservation Program and receive appropriate training. Hearing protection devices (HPD) shall be worn as applicable where noise exposure may be in excess of the ACGIH TLV. HPDs shall be used in strict accordance with the manufacturer's instructions and shall not be modified. HPDs shall be stored in a clean and dry location when not in use. Reusable HPDs shall be inspected before each use. Damaged or defective HPDs shall be immediately replaced. Reusable HPDs such as circumaural muffs shall be thoroughly cleaned, inside and out, before storage. HPDs shall be disinfected before use by another wearer. The Health and Safety Technician will identify times when noise levels may be above 85 dBA and conduct noise surveys and personal dosimetry as necessary to determine actual worker exposure to noise. The responsible Industrial Hygienist will specify the hearing protection devices that will be used when the Time-Weighted-Average noise exposures are likely to exceed 85 dBA.

Hazardous or Radioactive Materials & Equipment that Present a Hazard (SP Info)			
Item 1 · General Information **Type:** OTHER **Desc:** Noise **Comment:**			
Use Location		**Storage Location**	
Qty · UOM	n/a ·	**Qty · UOM**	n/a ·
Loc Site · Fac · Rm · Addl Info	LLNL · 419 · NA · including adjacent corporation yards	**Loc Site · Fac**	LLNL · none · none ·

Radiation - Ionizing/Non-Ionizing -Radioactive material (encapsulated, non-encapsulated) (Requires SP)
Hazard Name
URANIUM/TRITIUM
Description

Uranium and Tritium have been processed within the project work area. Depleted unalloyed and binary forms of uranium contamination may be present in labeled equipment and wall surfaces. Tritium was also detected in localized areas in previous surveys of rooms 124,155,and 167. This work performed in the facility included the use of local ventilation, and handling of items with potential uranium contamination in excess of ES&H Manual Document 20.2 limits. Individuals are not likely to receive doses in excess of 0.1 rem/y. ALARA goals are not established and a documented ALARA evaluation is not required.

Control

The following controls were established based on process knowledge and survey data available at the time of this document's drafting. Work activities will involve characterization surveys which may require increase in controls or establish a basis for the reduction of controls. Any changes to the controls listed shall be documented in this IWS with the concurrence of RI and AI.

Personal Protective Equipment:

Workers shall don a disposable coverall with integral hood and booties and a double layer of impermeable gloves (e.g. nitrile rubber) with inner layer taped to sleeve of coverall. Worker shall also don respiratory protection as specified by activity on the attached Hazards Assessment and Controls (HAC) document. If activities may involve industrial hazards such as sharp edges or pinch points workers shall don a sturdy work glove over the double layer of impermeable gloves. If activities will involve the use of water or other solvents in amounts that may create the potential for splashing, the disposable coverall will be upgraded to an impermeable material (e.g. poly-coated Tyvek®).

H&S Tech Coverage Requirements:

Work in known contaminated or uncharacterized systems or areas shall require continuous H&S tech coverage. This includes initial entry into the building. The H&S tech shall provide workers with guidance to prevent personnel contamination and to conduct surveys of personnel and affected areas. The H&S tech shall survey any newly exposed surfaces. The H&S tech shall survey the affected area following work activities to determine if any contamination may have been released.

Work in systems or areas known to be free of contamination shall require intermittent H&S tech coverage. The H&S tech shall be present when previously unexposed areas become exposed to conduct surveys. The H&S tech shall also survey affected areas following work activities to determine if any contamination may have been released.

If contamination is found above the limits listed in the "Hold Points" section a "Partial Stop Work" shall be called and the health physicist shall be contacted. An evaluation shall be conducted to determine if additional controls are necessary. If changes are necessary they shall be documented on this IWS with the concurrence of the RI and AI.

ALARA/Contamination Controls:

Workers performing authorized activities are unlikely to receive doses in excess of 0.1-rem/y. Administrative Control Levels (ACL) or formal ALARA review of these tasks is not required. The area health physicist shall maintain a running count of doses for all authorized workers. If any individual approaches 0.1-rem for the calendar year the RI and AI shall be informed so that a formal ALARA evaluation may be conducted.

Workers shall have contamination survey meters with them in the work area. Workers shall survey their persons and affected work areas periodically. If any contamination is found above the limits listed in the "Hold Points" section a Partial Work Stop shall be called and the H&S tech or health physicist shall be contacted. An evaluation shall occur to determine if additional controls are necessary. If changes are necessary they shall be documented in this IWS with the concurrence of the RI and AI before work may resume.

Any individual accessing R124, R155, or R167 shall survey themselves upon exiting. Decontamination of individuals shall occur in the Entry portal warm zone consistent with HAZWOPR reqirements.

Hold Points:

If any of the following hold points are encountered by workers a "Partial Stop Work" shall be called and the H&S tech and/or health physicist shall be contacted. The health physicist will evaluate the hazard and determine if additional controls are necessary. If changes are necessary they will be documented in this IWS with the concurrence of the RI and AI.

- Personnel contamination: Any level
- Contamination on PPE: 100-cpm alpha or 1,000-cpm beta or if contamination is widespread
- Area contamination: 1,000-cpm alpha or 10,000-cpm beta or if contamination is widespread

Dosimetry Requirements: All Radiological Workers shall be at least a quarterly 810 dosimeter exchange

cycle. Radiological workers shall also be enrolled in quarterly bioassay and annual whole body/lung count schedules.

Posting/Labeling:
The H&S tech shall post areas known to be contaminated through process knowledge and/or survey data as Contamination/High Contamination Areas, as appropriate. The H&S tech shall also establish Radiological Buffer Areas at the thresholds to the building. As contaminated items are removed or decontaminated and survey data is collected these areas may be down-posted by written acceptance of survey results by the health physicist.

Operational Controls:
During equipment removal and disassembly any "breaks" in potentially contaminated equipment or systems will be assumed to be "Hot" and follow the following controls, as applicable. Use sleeved accordion hot break technique for disassembly of contaminated lines, ducts, equipment, or filter assemblies. If appropriate HEPA-filtered air hog blowers may be used. Place contamination barriers on the floor of the area at the point where equipment is opened.

All equipment removed from B419 is expected to be disposed as Low-Level, Mixed, or California Combined Waste. No items are expected to be free released. Tools or other reusable equipment used during project execution will require release from the work area per the guidelines of HP FO-450 procedure or Table 3 of Document 20.2 of the ES&H Manual.

Hazardous or Radioactive Materials & Equipment that Present a Hazard (SP Info)			
Item 1 · General Information **Type:** RADIOACTIVE MATERIAL **Desc:** Uranium/tritium **Comment:**			
Use Location		**Storage Location**	
Qty · UOM	n/a ·	**Qty · UOM**	n/a ·
Loc Site · Fac · Rm · Addl Info	LLNL · 419 · NA · including adjacent corporation yards	**Loc Site · Fac**	LLNL · none · none ·

Temperature/Weather -Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes)
Hazard Name
HEAT STRESS
Description
Employee heat strain.

The areas where decontamination will take place will not be temperature controlled. Workers will be in high levels of PPE. The potential for workers to exhibit signs and symptoms of heat strain is apparent.

Heat strain depends on three primary variables:
1. Work clothing and PPE requirements
2. Work load or metabolic rate
3. Environmental conditions

Work load during the decontamination project will range from light to heavy based on criteria outlined in the American Conference of Governmental Industrial Hygienists (ACGIH) TLV booklet.

Required PPE is synthetic and non-breathable. This material is considered to restrict the free movement of dry air over the skin's surface and does not allow for evaporation and convection.

Environmental conditions will be a non-temperature controlled environment due to the requirement to shut off airflow in work areas.
Control
Personal monitoring of body temperature, when directed by the RI.

Drink plenty of fluids to stay hydrated. On average a minimum of 1 cup of water every 20 minutes.

Take frequent rest breaks in cool areas.

If symptoms such as extreme fatigue, muscle cramps, blurred vision, etc. occur, notify your supervisor and contact health services. Severe heat related symptoms can be fatal if intervention is not immediately pursued.

Contact the ES&H team to revise PPE if necessary for heat stress. If deemed appropriate the ES&H Team may downgrade PPE requirements. Changes shall be documented in this IWS with RI and AI concurrence.

For more information, visit the following LLNL website:
Heatwave: Worker Heat Stress Guidance, or paste the following into your browser: https://weather-int.llnl.gov/cgi/heatwave/WBGT_0.pl

Worker Capability/Motion -Work after hours
Hazard Name
INABILITY TO SELF-RESCUE
Description
Work may involve after hours and weekends.
Control
The two-person rule shall apply during all D&D operations performed after hours.

Before working after hours is authorized the RI shall evaluate the hazards of each activity and determine if work can be done safely after hours.

It is recommended that employees advise another person outside of LLNL if they will be working after hours and when they expect to complete the activity.

System Deactivation|TASK
The isolation (lock-out & tag-out) of electrical and mechanical systems prior to working on them. The re-routing and air gapping of the B419 Electrical and Mechanical Systems

Construction/Equipment/Working Surfaces -Soil disturbance, excavating, grading, and disposal
Hazard Name
TRENCHING AND POT HOLING
Description
Project scope will include trenching, backfilling, grading, use of jackhammers to remove concrete/asphalt, use of concrete saw and the use of pot holing equipment to remove soils. Excavations may cause entrapment/engulfment, or other injury because of collapsing trench walls. Saw cutting and jack hammering will expose personnel to silica dust, noise, wet surfaces, vibration and flying object hazards.
Control
All applicable controls stated in the ES&H Manual, Document 11.1, Section 18.0 "Concrete Penetration and Soil Excavation" and MUSD Document PROC-CON-0003 "Soil Excavation Permits at LLNL" shall be followed. The Soil Excavation Permit shall be reviewed by the ISE and all work shall be done in accordance with the conditions specified and following appropriate procedures. All excavation will be done under the supervision of a qualified competent person. Open excavations will be barricaded by portable handrails, ropes or cables. Excavations will be inspected by a competent person prior to each work shift. Water must be pumped from excavated areas prior to start of work, when workers are entering area. When trenching and utility work occurs near traffic areas; flaggers, traffic cones, delineators and flashers at night will be used. High visibility vests will be worn when working.

Personnel using pot holing equipment will wear hard hats, face shields and coveralls as the minimum protection against flying debris.

Hazards associated with silica dust, as a result of jackhammering operations are addressed under "Chemicals - Materials of Special Concern". At a minimum all precautions and PPE specified in the SAT Silica Dust HAC will be implemented during jackhammering operations.

Soil under the pot holing areas may be contaminated with organic solvents. Full face respirators with organic cartridges shall be worn during pot holing activities unless downgraded by the Industrial Hygienist. A HAC for pot holing activities is attached.

Construction/Equipment/Working Surfaces -Work at heights > 6 ft
Hazard Name
LIFTS AND LADDERS USE
Description
To isolate electrical or mechanical systems may require the use of lifts, scafolding and ladders. Improper use of this equipment could result in falls leading to serious injury or death.
Control

Handrails will be used whenever possible and other alternatives such as scaffolding and man lifts will be evaluated for use when working at heights above 6 feet. Use of fall protection (e.g., manlift, rolling scaffold, safety harness, etc.) is required whenever working over 6 feet in height. Fall restraint is required at all times when in an aerial lift basket or scissor lift. Any use of the aerial and scissor type lifts requires completion of the appropriate ES&H training course. Ladders shall be used in accordance with the ES&H Manual, Document 11.2, section 6.0, "Ladders". All personnel using ladders must first successfully complete both HS5959W and practical training PE5959 for the types ladder(s) that will be used. Project/activity fall protection requirements shall be determined by the designated competent person and/or the ES&H Team Industrial Safety Professional.

Electrical -Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power)
Hazard Name
ENERGIZED SYSTEMS
Description
The potential for electrical shock from energized circuits or equipment parts exists during this project.
Control
Workers must be aware that electrical power is live within the B419. All potential sources of electrical energy will be identified, isolated, and verified for "0" voltage prior to beginning any work. All applicable controls and requirements specified in ES&H Manual Documents 16.1 "Electrical Safety" and 12.6 "LLNL Lockout/Tagout Program will be implemented to mitigate the hazards associated with electricity.

Pressure/Noise/Hazardous Atmospheres -Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy
Hazard Name
PRESSURE IN MECHANICAL SYSTEMS
Description
Work will involve isolation and capping of low pressure water and air systems.
Mechanical systems in the facility may have pressure sources (gas or liquid) that if released in an uncontrolled stream could result in eye and/or skin damage.
Control
Coordinate with Facility FPOC and operations personnel to confirm sources of pressure in utility services which shall be LOTO'd. Confirm zero pressure on the D&D work side of the isolation. Use ES&H Manual Document 18.1 "Pressure" for general requirements and have workers passed training class HS5030-W, Pressure Safety Training.

Remediation and Monitoring -Movement/disposal of soil
Hazard Name
MOVEMENT OF SOIL
Description
There is the potential to generate soil/concrete/asphalt waste under this project.
Control
Any disturbed soil/asphalt/concrete must be sampled for disposition. The EA is to be notified of this work prior to starting so that sampling may be set up. Stage all disturbed materials on plastic and cover with plastic to prevent migration from the project area.

Worker Capability/Motion -Lifting manually >30 pounds
Hazard Name
LIFTING MANUALLY >30 POUNDS
Description
Lifting equipment greater than 30lbs can generate back and leg injuries.
Control
All applicable controls stated in Document 11.2, "Hazards - General and Miscellaneous," and 15.2 "Manual and Mechanical Material Handling" of the ES&H Manual shall be followed.
The two-person rule shall apply during all D&D operations, except
before authorizing work-alone operations. The Project RI shall evaluate the hazards of each activity that could be classified as hazardous-for-working-alone. Contact the Facility Health & Safety Technician or designee for assistance with analyzing the hazards and controls for specific types of work. Authorized work-alone staff shall maintain contact with the work supervisor until completion of the activity. In keeping with ISM, work alone authorization shall be kept to a minimum. Non-hazardous work in office areas is exempt from this requirement.
The two-man rule is in effect any time manual lifting in excess of 30 pounds is required.

Worker Capability/Motion -Hand tools

Hazard Name
HAND TOOLS
Description
The use of hand and power tools and extended work hours will be encountered in this operation.
Control
All applicable controls stated in Document 11.2, "Hazards - General and Miscellaneous" of the ES&H Manual shall be followed. The use of power tools may expose personnel to the hazards of flying objects, sharp edges, pinch points, etc. Before use, all tools shall be inspected for condition. Fatigue may be a factor during extended work hours and supervision must be present to remain observant and aware of any signs of employees not adhering to normal work and safety practice.

Removal of Items|TASK
The removal of equipment, material and systems from B419

Construction/Equipment/Working Surfaces -Working on contaminated equipment
Hazard Name
REMOVING CONTAMINATED EQUIPMENT
Description
Contamination is known to exist within B419. Equipment is assumed to be contaminated
Control
Equipment removal shall follow the controls listed in the radioactive materials hazard section of the "All Tasks" task.

Construction/Equipment/Working Surfaces -Work at heights > 6 ft
Hazard Name
LIFTS, SCAFFOLDING AND LADDERS
Description
The use of scissor or boom type lifts, ladders, cranes, and scaffolding will be required during equipment, material and systems removal operations. Improper use of this equipment could result in fall resulting in serious injury or death.
Control
Handrails will be used whenever possible and other alternatives such as scaffolding and man lifts will be evaluated for use when working at heights above 6 feet. Use of fall protection (e.g., manlift, rolling scaffold, safety harness, etc.) is required whenever working over 6 feet in height. Fall restraint is required at all times when in an aerial lift basket or scissor lift. Any use of the aerial and scissor type lifts requires completion of the appropriate ES&H training course. Ladders shall be used in accordance with the ES&H Manual, Document 11.2, section 6.0, "Ladders". All personnel using ladders must first successfully complete both HS5959W and practical training PE5959 for the types ladder(s) that will be used. Project/activity fall protection requirements shall be determined by the designated competent person and/or the ES&H Team Industrial Safety Professional.

Worker Capability/Motion -Lifting manually >30 pounds
Hazard Name
LIFTING MANUALLY >30 POUNDS
Description
Lifting equipment greater than 30lbs can generate back and leg injuries.
Control
All applicable controls stated in Document 11.2, "Hazards - General and Miscellaneous," and 15.2 "Manual and Mechanical Material Handling" of the ES&H Manual shall be followed.
The two-person rule shall apply during all D&D operations, except
before authorizing work-alone operations. The Project RI shall evaluate the hazards of each activity that could be classified as hazardous-for-working-alone. Contact the Facility Health & Safety Technician or designee for assistance with analyzing the hazards and controls for specific types of work. Authorized work-alone staff shall maintain contact with the work supervisor until completion of the activity. In keeping with ISM, work alone authorization shall be kept to a minimum. Non-hazardous work in office areas is exempt from this requirement.
The two-man rule is in effect any time manual lifting in excess of 30 pounds is required.

Worker Capability/Motion -Hand tools
Hazard Name
USING HAND TOOLS
Description
Removal work will require the use of hand tools and mechanical equipment. The use of power tools may

expose personnel to the hazards of flying objects, shart edges, pinch points, etc.

Control

Before use, all tools shall be inspected for conditions. Electrical power tools shall either have a 3-prong plug or be double insulated. Prior to power tool use, the GFCI will be tested. Make sure the proper tool is used for the task and that the tool is serviceable. Take damaged tools out of service and return them to supervisor for replacement. Report any discomfort promptly to your supervisor so that an appropriate evaluation can be made. Additional controls can be found in ES&H Manual Document 11.2 "Hazards - General and Miscellaneous".

Decontamination|TASK

Decontaminate rooms, facility/utility systems and equipment in preparation for demolition and processing as waste.

Construction/Equipment/Working Surfaces -Work at heights > 6 ft

Hazard Name

LIFTS, SCAFFOLDING AND LADDERS

Description

The use of scissor or boom type lifts, ladders, cranes, and scaffolding will be required during room preparation and contamination efforts.

Control

Handrails will be used whenever possible and other alternatives such as scaffolding and man lifts will be evaluated for use when working at heights above 6 feet. Use of fall protection (e.g., manlift, rolling scaffold, safety harness, etc.) is required whenever working over 6 feet in height. Fall restraint is required at all times when in an aerial lift basket or scissor lift. Any use of the aerial and scissor type lifts requires completion of the appropriate ES&H training course. Ladders shall be used in accordance with the ES&H Manual, Document 11.2, section 6.0, "Ladders". All personnel using ladders must first successfully complete both HS5959W and practical training PE5959 for the types ladder(s) that will be used. Project/activity fall protection requirements shall be determined by the designated competent person and/or the ES&H Team Industrial Safety Professional.

Radiation - Ionizing/Non-Ionizing -Radioactive material (encapsulated, non-encapsulated)

Hazard Name

DECONTAMINATION OF EQUIPMENT

Description

Contamination is known to exist within B419. Following characterization surveys items or building structures may be chosen to be decontaminated prior to building demolition. Workers may have to come in contact with radiological contamination which may lead to worker exposure.

Control

Hazards from non-aggressive methods of decontamination such as wiping or paint-and -peel are adequately controlled under the controls listed in the radioactive materials hazard section in the "All Tasks" task.

Aggressive methods using mechanical means, e.g. scabbling, or chemicals beyond mild detergents or latex paints shall be evaluated on a case-by-case basis. If evaluation requires addition of controls they shall be documented in this IWS with concurrence of the RI and AI.

Worker Capability/Motion -Hand tools

Hazard Name

USING HAND TOOLS

Description

Decontamination preparation and field work will require the use of hand tools and mechanical equipment. The use of power tools may expose personnel to the hazards of flying objects, sharp edges, pinch points, etc.

Control

Before use, all tools shall be inspected for condition, Electrical power tools shall either have a 3-prong plug or be double insulated. Prior to power tool use, the GFCI will be tested. Make sure the proper tool is used for the task and that the tool is serviceable. Take damaged tools out of service and return them to supervisor for replacement. Report any discomfort promptly to your supervisor so that an appropriate evaluation can be made. Additional information can be found in the ES&H Manual, Document 11.2, "Hazards--General and Miscellaneous". .

Abatement|TASK
Removal of asbestos containing floor tiles and possibly other ACM including TSI. Removal, enclosure or encapsulation of degraded/chipped paint that may contain lead.

Chemical (Hazardous Material) -Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB)
Hazard Name
ASBESTOS/LEAD
Description
Removal of asbestos containing floor tiles and possibly other ACM including TSI. Removal, enclosure or encapsulation of degraded/chipped paint that may contain lead.
Control
Follow LLNL processes, obtain an asbestos work permit (AWP) and attach it to this IWS, use the Site Wide permit if the quantity is within it's requirements or contact the IH to secure an off-site permit.
Lead controls
1. Use PPE described in the Be Decontamination task beryllium hazard control section.
2. Use a HEPA vacuum and wet wipes to dislodge, capture and clean paint chips and particulate.
3. The H&S Technician will collect surface wipe samples for lead from surfaces in the work area after completion.

Discharges to Air -Hazardous Air Pollutants (e.g., beryllium, radioactive materials used)
Hazard Name
FRIABLE ASBESTOS IS A HAZARDOUS AIR POLLUTANT
Description
Removal of friable asbestos is subject to notification requirements under Bay Area Air Quality Management District (BAAQMD) regulations.
Control
Removal of friable asbestos in quantiites greater than 100 linear feet, 100 square feet, or 35 cubic feet requires notification at least 10 days in advance to the BAAQMD. Contact EPD as early as possible to begin this notification process (at least 30 days prior to abatement).

Worker Capability/Motion -Lifting manually >30 pounds
Hazard Name
LIFTING MANUALLY >30 POUNDS
Description
Lifting equipment greater than 30lbs can generate back and leg injuries.
Control
All applicable controls stated in Document 11.2, "Hazards - General and Miscellaneous," and 15.2 "Manual and Mechanical Material Handling" of the ES&H Manual shall be followed.
The two-person rule shall apply during all D&D operations, except
before authorizing work-alone operations. The Project RI shall evaluate the hazards of each activity that could be classified as hazardous-for-working-alone. Contact the Facility Health & Safety Technician or designee for assistance with analyzing the hazards and controls for specific types of work. Authorized work-alone staff shall maintain contact with the work supervisor until completion of the activity. In keeping with ISM, work alone authorization shall be kept to a minimum. Non-hazardous work in office areas is exempt from this requirement.
The two-man rule is in effect any time manual lifting in excess of 30 pounds is required.

Worker Capability/Motion -Hand tools
Hazard Name
HAND TOOLS
Description
The use of hand and power tools and extended work hours will be encountered in this operation.
Control
All applicable controls stated in Document 11.2, "Hazards - General and Miscellaneous" of the ES&H Manual shall be followed. The use of power tools may expose personnel to the hazards of flying objects, sharp edges, pinch points, etc. Before use, all tools shall be inspected for condition. Fatigue may be a factor during extended work hours and supervision must be present to remain observant and aware of any signs of employees not adhering to normal work and safety practice.

Building Demolition|TASK
Destruction of the building and reducing the debris to rubble. Separating the metal from the concrete and wood. Loading all the post demolition materials into waste disposal containers for transport.

Construction/Equipment/Working Surfaces -Construction, maintenance, modification, demolition

Hazard Name

CONSTRUCTION, MAINTENANCE, DEMOLITION

Description

Physical hazards, typically encountered in a disassembly/removal of equipment and structures are present in this operation. Power tools, power equipment expose workers to "struck-by" hazards. Tripping, falling, and slipping are potential hazards that could lead to personnel injuries (e.g., sprains, strains, and fractures). Falling debris from overhead presents a hazard. Employees can be struck in the head by unstable debris shifting or falling due to changing conditions. Conditions constantly change during D&D activities.

Control

Assess each room and specific activity for hazards prior to work being initiated. Each working group should identify hazards and the associated controls prior to starting each task. Enforcing the stop work policy is encouraged any time a situation is not understood by all participants or an unsafe or changing condition arises. Assess the upstream and downstream equipment and/or piping prior to removal to prevent falling object(s) and overhead object(s) falling hazards. Housekeeping and prompt removal of demolition debris will lower the risk of slip, trip and fall hazards. The operator of any powered equipment must have a clear field of vision, or a spotter when working in the vicinity of other activities, or common thoroughfares. Follow all applicable controls stated in Document 11.2 "Hazards - General and Miscellaneous."SHARP EDGES/SHEARS

Construction/Equipment/Working Surfaces -Moving/lifting large or heavy items (including use of cranes/hoists, powered lift)

Hazard Name

CRANE OPERATIONS (PERFORMED BY QUALIFIED RIGGERS)

Description

rane operations (performed by qualified riggers) will be performed during electrical/mechanical deactivation activities. Heavy loads (blocks, steel, etc) will be reloacted and removed from the site using the wexisting in-house crane as well as mobile units brought to the site.

Control

All rigging and lifting operations will be performed in accordance with ES&H Manual Section 15.3 "Crane, Hoist, and Rigging Safety". Only qualified personnel will rig loads and operate cranes within the facility. Lifting and rigging operations wil be performed under the trade specific IWS #414.05.

Construction/Equipment/Working Surfaces -Welding, soldering, thermal cutting

Hazard Name

WELDING, SOLDERING, THERMAL CUTTING

Description

Work may require torch cutting of steel, flame desoldering of pipe, or high speed (spark producing) sawing of concrete or steel. Such operations could act as a source of ignition.

Control

A hot work permit is required before any torch cutting operations or any other work that uses or creates flames or sparks. A fire watch will be posted during all hot work (i.e. torch cutting or desoldering) and will remain to monitor the site for 30 minutes after all hot work (ie. torch cutting or desoldering) has been completed/stopped. Combustible materials shall be removed or protected with fire curtains.

All smoke detectors will be disconnected and removed prior to demolition. All alarms and emergency evacuation page systems will be removed or relocated (if serve more than one trailer/building) prior to demolition. Fire sprinklers and fire extinguishers shall remain in service until just prior to demolition. Welders and Fire watches will be trained on Fire extinguisher use at least annually.

If welding indoors contact the cognizant industrial hygienist to determine any additional PPE requirements. In addition if welding lead based material follow the controls listed in Chemical (Hazardous Material).

Construction/Equipment/Working Surfaces -Walking/working on irregular surfaces

Hazard Name

WALKING/WORKING ON IRREGULAR SURFACES

Description

Uneven walking surfaces create a slip, trip and fall hazard.

Control

Use of fall protection (e.g. manlift, safety harness, etc.). Project/activity fall protection requirements shall be determined by the designated competent person and/or the ES&H Team Industrial Safety Professional and incorporated into the appropriate safety document. Guardrails will be used whenever possible and other alternatives such as scaffolding and man lifts will be evaluated for use when working at heights above 6 feet.

Construction/Equipment/Working Surfaces -Work at heights > 6 ft

Hazard Name

WORK AT HEIGHTS > 6 FT

Description

Working at heights may result in falls which could result in serious injury or death.

Control

Use of fall protection (e.g. manlift, safety harness, etc.). Project/activity fall protection requirements shall be determined by the designated competent person and/or the ES&H Team Industrial Safety Professional and incorporated into the appropriate safety document. Guardrails will be used whenever possible and other alternatives such as scaffolding and man lifts will be evaluated for use when working at heights above 6 feet.

Discharges to Air -Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust)

Hazard Name

PRODUCES CRITERIA POLLUTANTS (E.G., ORGANICS, NOX,

Description

Outdoor dust may be generated during soil excavation or grading.

Control

Mist area with water to control dust. Ensure that water does not run out of work area or into storm drains.

Discharges to Air -Hazardous Air Pollutants (e.g., beryllium, radioactive materials used)

Hazard Name

POTENTIAL FOR RELEASE OF RADIOACTIVE MATERIALS

Description

Due to the building history, there is a potential for demolition activities to release radioactive material to the air.

Control

In order to ensure that any release is in compliance with NESHAPs (40CFR61, Subpart H), sample data will be provided to EMAD in EPD for source term modeling prior to and durring any demolition activities. Monitors shall be placed at the perimeter of the project and visible from outside of the project boundary.

Discharges to Air -Source regulated by Air District

Hazard Name

SOURCE REGULATED BY AIR DISTRICT

Description

Demolition of a structure requires a 10-day notification to be made to the Bay Area Air Quality Management District (BAAQMD).

Control

Ensure that necessary BAAQMD notification for demolition is made at least 10 days prior to work. Contact Steve Cerruti of the Environmental Protection Department or the EA as early as possible to start this notification process (at least 30 days prior to start of demolition).

Discharges to Water/Soil/Groundwater -Discharge to ground/soil or storm drain system

Hazard Name

DISCHARGE TO GROUND/SOIL OR STORM DRAIN SYSTEM

Description

The hazard exists for exposure to the environment from soil pile water runoff

Control

Protect all routes of entry to the environment (e.g., soil, asphalt, storm sewer, drainage channels, etc.) especially during rainy season. Place soil/debris on plastic and under plastic until characterization is complete and has been released by the EA. After demolition, the lot must be stabilized to prevent erosion.

The LLNL construction storm water permit will cover the demolition if the total area of disturbed soil is less than one acre.

Worker Capability/Motion -Lifting manually >30 pounds

Hazard Name

LIFTING MANUALLY >30 POUNDS

Description

Lifting equipment greater than 30lbs can generate back and leg injuries.

Control

All applicable controls stated in Document 11.2, "Hazards - General and Miscellaneous," and 15.2 "Manual and Mechanical Material Handling" of the ES&H Manual shall be followed.
The two-person rule shall apply during all D&D operations, except

before authorizing work-alone operations. The Project RI shall evaluate the hazards of each activity that could be classified as hazardous-for-working-alone. Contact the Facility Health & Safety Technician or designee for assistance with analyzing the hazards and controls for specific types of work. Authorized work-alone staff shall maintain contact with the work supervisor until completion of the activity. In keeping with ISM, work alone authorization shall be kept to a minimum. Non-hazardous work in office areas is exempt from this requirement.
The two-man rule is in effect any time manual lifting in excess of 30 pounds is required.

Worker Capability/Motion -Hand tools
Hazard Name
HAND TOOLS
Description
The use of hand and power tools and extended work hours will be encountered in this operation.
Control
All applicable controls stated in Document 11.2, "Hazards - General and Miscellaneous" of the ES&H Manual shall be followed. The use of power tools may expose personnel to the hazards of flying objects, sharp edges, pinch points, etc. Before use, all tools shall be inspected for condition. Fatigue may be a factor during extended work hours and supervision must be present to remain observant and aware of any signs of employees not adhering to normal work and safety practice.

Waste Pkg/Handling|TASK
The packaging and handling of the project waste including PPE, decontamination materials, and equipment, material and systems removed from B419.

Waste -Hazardous waste
Hazard Name
HAZARDOUS WASTE
Description
Activities performed under this IWS may generate hazardous waste.
Control
Contact the ES&H Team Environmental Analyst for assistance in characterizing all waste items.

Hazardous wastes must be managed by RHWM technicians. Hazardous waste may be stored in a Waste Accumulation Area (WAA) for up to 90 days before being transported directly to the RHWM facility or directly to the ultimate disposal facility under the direction of the RHWM management. All regulated waste will be managed in accordance with ES&H Manual Documents 36.1 "Hazardous, radioactive and Biological Waste Management Reguirements", 36.3 "Management of Satellite and Waste Accumulation Areas for Hazardous and Mixed Waste" and 30.1 "Waste Minimization and Pollution Prevention".

Waste -Radioactive waste (TRU,LLW)
Hazard Name
RADIOACTIVE WASTE
Description
B419 decontamination, removal of equipment, demolition of the structure and systems will generate radioactive waste.
Control
Contact the ES&H Team Environmental Analyst for assistance in characterizing all waste items.

Radiological waste will be managed by RHWM technicians. The Waste will be loaded into an appropriate disposal container. LLW cannot contain free flowing liquids. Drysorb or other absorbent material should be added to waste containers used to collect spent wipes generated by decontamination activities.

Radioactive waste will be kept in a secure storage location (e.g., WAA, etc.) until it is either transported to the RHWM facility or directly to the ultimate disposal facility under the direction of RHWM management.

All regulated waste will be managed in accordance with the ES&H Manual Documents 36.1 "Hazardous, Radiological and Biological Waste management Requirements", 36.3 "Management of Satellite and Waste Accumulation Areas for Hazardous and Mixed Waste" and 30.1 "Waste Minimization and Pollution Prevention".

Waste -Mixed waste or other waste with no disposal option
Hazard Name
GENERATION OF MIXED WASTE

Description
Activities performed under this IWS will generate mixed waste.
Control
Contact the ES&H Team Environmental Analyst for assistance in characterizing all waste items.

Mixed wastes must be managed by RHWM technicians. Mixed waste may be stored in a WAA for up to 90 days prior to being transported to the RHWM facility or directly to the ultimate disposal facility under the direction of the RHWM management. All regulated waste will be managed in accordance with ES&H Manual Documents 36.1 "Hazardous, radioactive and Biological Waste Management Reguirements", 36.3 "Management of Satellite and Waste Accumulation Areas for Hazardous and Mixed Waste" and 30.1 "Waste Minimization and Pollution Prevention".

Consult with RHWM to assure that an Information Gathering Document (IGD) is prepared for the waste stream and that the waste adheres to the acceptance criteria. Mixed waste cannot contain free flowing liquids. Drysorb or other absorbent material should be added to waste containers used to collect spent wipes generated by decontamination activities.

LLNL - 419|LOCATION
including adjacent corporation yards

Chemical (Hazardous Material) -Beryllium
Hazard Name
BERYLLIUM
Description
Potential exposure to Be during entry and activities that may take place as part of the B419 RCRA Closure Project.
Control
Minimum Job-Site Entry Requirements:

Administrative:
Entry approval given by the Project's RI and Project Manager, Valerie Morrow, Room Responsible Individual (2-9246 / 51716)
Sign the B419 Project Job Site Entry logbook (tracks time in, time out and activity) which is located in T4150.
Read and sign the daily PTHA, also located in T4150.

Training:
Beryllium Worker (HS4256)
Air Purifying Respirator (HS4610-W)
Air Purifying Respirator Fit Test (HS4610-P)
Personal Protective Equipment (HS4685-W)
Site-Specific PPE & Air Monitoring Don/Doff Procedures (given by IH or H&S Technician)

Medical Surveillance:
Beryllium Associated Worker

Personal Protective Equipment:
Don and doff PPE according to posted procedures, which is also attached to this IWS.

Air Monitoring:
Don and doff air monitoring equipment according to posted procedures, which is also attached to this IWS.

POTENTIAL ACCIDENTS AND CONSEQUENCES

Potential accidents include, uncontrolled building debris becoming airborne. Uncontrolled demolition spoils leaving the project area. the consequences are mitigated by the controls and can not affect the worker, the co-located worker or the public

OTHER 'KEY ES&H LIMITS' NOT SPECIFIED IN 'HAZARD DESCRIPTIONS AND CONTROLS

Waste containers will meet the WAC for the accepting waste facility.

MAINTENANCE, INSPECTIONS, AND QUALITY ASSURANCE

The quality assurance and inspection requirements shall meet the requirements of the B419 Closure Plan, the Site Execution Plan, the B419 FQAP and the Project execution Plan

EMERGENCY RESPONSE PLANS AND PROCEDURES

The B419 Contingency plan will serve as the emergency response plan

ADDITIONAL SITE LOCATION/DIRECTORATE-SPECIFIC INFORMATION

Additional requirements that need to be met before work can commence

None Specified.

LLNL PERMITS/APPROVALS/CONSULTATIONS/REPORTING

1) Asbestos permit

2) Hot work

3) Significant environmental aspect(s) identified

[Note: Materials of Concern (asbestos and lead) may be encountered during this activity. Activities involving these materials are considered "Significant Environmental Aspects." In addition, the generation of radioactive waste is also considered a Significant Environmental Aspect. Impacts have been considered and addressed in the controls.]

Significant Environmental Aspect

AGENCY WORK PERMITS/APPROVALS

1) Air district notification for asbestos and/or demolition

Significant Environmental Aspect

SIGNATURES

As the RI, I have accurately defined the work scope, reviewed the hazards and agree to implement the controls identified in this IWS.

MORROW, VALERIE L — 05/21/2010

RESPONSIBLE INDIVIDUAL (RI) — DATE

As the Facility Point of Contact, I concur that the proposed work falls within the safety envelope of the facility/area and is compatible with planned facility operations.

COSTELLA, MARK P — 05/14/2010

IWS FACILITIES CONCURRENCE PROVIDER, — DATE

LLNL - Bldg: 419 - Rooms: NA - Add'l Info: including adjacent corporation yards

As the IWS ESH Concurrence person, I concur that the hazards for this work have been properly identified and appropriate controls have been selected.

DREGER, KURT W — 05/14/2010

IWS GROUP ROLE - ESH CONCURRENCE, — DATE

LLNL - Bldg: 419 - Rooms: NA - Add'l Info: including adjacent corporation yards

As the AI, I have confirmed that the controls identified in this IWS are implemented, and that the work is scheduled and ready to be performed. I approve the work to proceed to release by the facility management.

STEENHOVEN, JUDITH C — 05/21/2010

APPROVING INDIVIDUAL (AI) — DATE

EMPLOYEES AND GUESTS ASSIGNED TO THIS ACTIVITY AND THEIR ASSOCIATED REQUIREMENTS

ALBERT, JOSEPH S — **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* -

Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

HS4050-W: Health Hazards Communication For Supervisors (1.5 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), IS0013-W: LInl Work Planning And Control For Ai'S, Ri'S, And Other Key Work Control Personnel (1.5 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification

Beryllium associated worker (potentially exposed less than 10 days/year) INACTIVE , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Respirator required

COSTA, JEFFREY P **Read & Sign:** Yes

Assigned Tasks

1. *All Tasks*
2. *System Deactivation*
3. *Removal of Items*
4. *Decontamination*
5. *Abatement*
6. *Building Demolition*
7. *Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

HS4150: Confined-Space Entry (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8004: High-Reach Bucket Truck Training (1.5 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification
Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

COUFALIK, CHRISTOPHER F **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards
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Required Training
EP0006-COR: Regulated Waste Generation And Certification Core Training (2 hrs) (**Y**), EP0006-HZ: Hazardous Waste Generation And Certification Module (2 hrs) (**Y**), EP0006-RD: Radioactive Waste Generation And Certification Module (2 hrs) (**Y**), HS4152: Confined-Space Instruments (3 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification
Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

DIXON, ROY L **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards
Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive

material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

HS4150: Confined-Space Entry (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

EBERSTEIN, MATTHEW W **Read & Sign:** Yes

Assigned Tasks

1. *All Tasks*
2. *System Deactivation*
3. *Removal of Items*
4. *Decontamination*
5. *Abatement*
6. *Building Demolition*
7. *Waste Pkg/Handling*

Hazards

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Required Training

EP0006-COR: Regulated Waste Generation And Certification Core Training (2 hrs) (**Y**), EP0006-HZ: Hazardous Waste Generation And Certification Module (2 hrs) (**Y**), EP0006-RD: Radioactive Waste Generation And Certification Module (2 hrs) (**Y**), HS4152: Confined-Space Instruments (3 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**N**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory

Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

FULLER, JACK T **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

EP0006-HZ: Hazardous Waste Generation And Certification Module (2 hrs) (**Y**), EP0006-RD: Radioactive Waste Generation And Certification Module (2 hrs) (**Y**), EP0053-W: Waste Accumulation Area (Waa) Operations-W (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**), RH5012-001: Contractor Advanced Respiratory Protection Self Contained Breathing Apparatus (Scba) And Powered Air-Purifying Respirators (1.5 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

HARTWIG, JAMIE F **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards

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power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

EP0006-HZ: Hazardous Waste Generation And Certification Module (2 hrs) (**Y**), EP0006-RD: Radioactive Waste Generation And Certification Module (2 hrs) (**Y**), EP0053-W: Waste Accumulation Area (Waa) Operations-W (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**N**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**), RH5012-001: Contractor Advanced Respiratory Protection Self Contained Breathing Apparatus (Scba) And Powered Air-Purifying Respirators (1.5 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

MISA, RANDY J **Read & Sign:** Yes

Assigned Tasks

1. All Tasks	*2. System Deactivation*	*3. Removal of Items*	*4. Decontamination*
5. Abatement	*6. Building Demolition*	*7. Waste Pkg/Handling*	

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* -

Beryllium

Required Training

HS4150: Confined-Space Entry (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8004: High-Reach Bucket Truck Training (1.5 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

MITCHELL, BRIAN R **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

EP0006-COR: Regulated Waste Generation And Certification Core Training (2 hrs) (**Y**), EP0006-HZ: Hazardous Waste Generation And Certification Module (2 hrs) (**Y**), EP0006-RD: Radioactive Waste Generation And Certification Module (2 hrs) (**Y**), HS4150: Confined-Space Entry (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), IS0013-W: Llnl Work Planning And Control For Ai'S, Ri'S, And Other Key Work Control Personnel (1.5 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

MORROW, VALERIE L **Read & Sign:** Yes

Assigned Tasks

1. All Tasks

Hazards

Noise - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Beryllium* - Beryllium

Required Training

EP0006-COR: Regulated Waste Generation And Certification Core Training (2 hrs) (**Y**), EP0006-HZ: Hazardous Waste Generation And Certification Module (2 hrs) (**Y**), EP0006-RD: Radioactive Waste Generation And Certification Module (2 hrs) (**Y**), HS4050-W: Health Hazards Communication For Supervisors (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**N**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**N**), IS0013-W: LInl Work Planning And Control For Ai'S, Ri'S, And Other Key Work Control Personnel (1.5 hrs) (**Y**)

Medical Surveillance/Certification

Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

NEEDENS, RICHARD T **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

HS4150: Confined-Space Entry (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**N**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

PADEN, MICHAEL D **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

HS4150: Confined-Space Entry (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8004: High-Reach Bucket Truck Training (1.5 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

RODRIGUEZ, PAUL R **Read & Sign:** Yes

Hazards

None Specified

Required Training

None Specified

Medical Surveillance/Certification

None Specified

STROHMAN, BRUCE A **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury,

PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

HS4150: Confined-Space Entry (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**N**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

VANDERPOL, DENNIS L **Read & Sign:** Yes

Assigned Tasks

1. *All Tasks*

Hazards

Noise - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Beryllium* - Beryllium

Required Training

None Specified

Medical Surveillance/Certification

None Specified

WILLIS, TREMAYNE H **Read & Sign:** Yes

Assigned Tasks

1. *All Tasks*
2. *System Deactivation*
3. *Removal of Items*
4. *Decontamination*
5. *Abatement*
6. *Building Demolition*
7. *Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine,

asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

HS4150: Confined-Space Entry (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**Y**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5690-CERT: Incidental Crane-Certification (1 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**N**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

XAVIER, EDWARD M **Read & Sign:** Yes

Assigned Tasks

1. *All Tasks*
2. *System Deactivation*
3. *Removal of Items*
4. *Decontamination*
5. *Abatement*
6. *Building Demolition*
7. *Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

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Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the

management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

ZANDER, AARON W **Read & Sign:** Yes

Assigned Tasks

1. All Tasks *2. System Deactivation* *3. Removal of Items* *4. Decontamination*
5. Abatement *6. Building Demolition* *7. Waste Pkg/Handling*

Hazards

Low Pressure - Low Pressure systems <150 psig-gas, <1500 psig liquid, <100 kJ stored energy, *Drilling Exacavt* - Soil disturbance, excavating, grading, and disposal, *Work Heights* - Work at heights > 6 ft, *Power Sources* - Electrical power source (>140 V or >30 A or >10 J of electrical, or 2 or more sources of electrical power), *Soil Movement* - Movement/disposal of soil, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Contaminated Eq* - Working on contaminated equipment, *Work Heights* - Work at heights > 6 ft, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Noise* - Noise (>85 dB), *Other Biologl* - Other biological, *Other Animals* - Other animals (wild, domestic, insects), *Sharps Needles* - Sharps/needles, *Beryllium* - Beryllium, *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Sharp Edges* - Sharp edges/shears, *Fire* - Unique fire safety issues, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Weather Exposure* - Weather exposure or temperature extremes (harsh weather, lightning, temperature extremes), *Work After Hours* - Work after hours, *Hazardous Waste* - Hazardous waste, *Mixed Waste* - Mixed waste or other waste with no disposal option, *Radioactive Waste* - Radioactive waste (TRU,LLW), *Work Heights* - Work at heights > 6 ft, *Radioactive matrl* - Radioactive material (encapsulated, non-encapsulated), *Hand Tools* - Hand tools, *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Special Matrls* - Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB), *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Criteria Pltnts* - Produces criteria pollutants (e.g., organics, NOx, ozone, outdoor dust), *Air Pollutants* - Hazardous Air Pollutants (e.g., beryllium, radioactive materials used), *Source Regulated* - Source regulated by Air District, *Construction* - Construction, maintenance, modification, demolition, *Heavy Lifting* - Moving/lifting large or heavy items (including use of cranes/hoists, powered lift), *Irregular Surf* - Walking/working on irregular surfaces, *Welding-Solder* - Welding, soldering, thermal cutting, *Work Heights* - Work at heights > 6 ft, *Dischrg Grnd Drn* - Discharge to ground/soil or storm drain system, *Hand Tools* - Hand tools, *Lifting* - Lifting manually >30 pounds, *Beryllium* - Beryllium

Required Training

HS4150: Confined-Space Entry (2 hrs) (**Y**), HS4240-W: Chemical Safety (1.5 hrs) (**Y**), HS4256: Beryllium Worker Training (2.5 hrs) (**N**), HS4262: Lead Worker Training (1.5 hrs) (**Y**), HS4362-W: Noise For Hearing Conservation (1.5 hrs) (**Y**), HS4610-P: Basic Air Purifying Respirator Training Fit Test (.5 hrs) (**Y**), HS4685-W: Personal Protective Equipment (Ppe) For Non-Laboratory Applications (1.5 hrs) (**Y**), HS5220-W: Electrical Safety Awareness (2 hrs) (**Y**), HS5245-W: Lockout And Tag (3 hrs) (**Y**), HS5300: Back Care Workshop (3 hrs) (**Y**), HS5311-W: Ergonomics---The Selection And Use Of Hand Tools (.5 hrs) (**Y**), HS5959-W: Stairways And Ladders (1 hrs) (**Y**), HS5960: Fall Protection (2 hrs) (**Y**), HS6340: Anti-Cs (2 hrs) (**Y**), PE5959: Ladder Hands-On - Fixed, Portable, And Extension (1 hrs) (**Y**), PE8004: High-Reach Bucket Truck Training (1.5 hrs) (**Y**), PE8019: Scissor Manlift Operator Training (1 hrs) (**Y**), PE8220: Initial Ahera Contractor Worker/Supervisor Practices & Procedures (40 hrs) (**Y**)

Medical Surveillance/Certification

Asbestos worker , Beryllium associated worker (potentially exposed less than 10 days/year) INACTIVE , Beryllium associated worker (potentially exposed) , Employees whose primary job duty is the management or disposal of hazardous waste. , Hearing Conservation required , Lead handler , Respirator required

ASSIGNED EMPLOYEE ROSTER INFORMATIO
No Assigned Employee Roster Information.

ADDITIONAL TRAINING INFORMATION
Untrained workers are not allowed to perform radiological work under any circumstances.

Enclosure 2

D&D Standard Operating Procedure

LLNL Environmental Restoration Department (ERD)
Standard Operating Procedure (SOP)

ERD SOP 6.1: Decontamination and Decommissioning (D&D) Team - Standard Operating Procedure 001 —Revision: 2

AUTHOR:
Michele Dermer

APPROVALS: Date

3/20/09
Department Manager

3/20/09
Decommissioning & Demolition Team Leader

CONCURRENCE: Date

3/20/2009
ES&H Team Leader

Rebecca Goodrich 3/20/09
QA Implementation Coordinator

Type of Procedure (per ES&H Manual, Document 3.4)

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Tables

Table 1. Standards and Limits for Occupational Exposure to Airborne Beryllium

Attachments

Attachment A — SOP Communication Form
Attachment B — D&D Team Communication Flow Process Diagram
Attachment C — D&D Team OSHA Regulations, Subpart T-Demolition
Attachment D — Workforce Planning Documentation
Attachment E — Monthly Accounting Tracking Tool (MATT) Example
Attachment F — D&D Protocols
Attachment G — Sample Plan for Waste Characterization
Attachment H — D&D Generic Standard Operating Procedures

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide general instructions to all Livermore Site and Site 300 Deactivation, Decommissioning, Decontamination, and Demolition (D&D) Team Personnel concerning activities required to be performed before, during, and after D&D activities. These instructions are to ensure that D&D team personnel understand the site, the objective and schedule of the D&D program, their authority, and their responsibilities.

D&D work activities are not sufficiently addressed in the Lawrence Livermore National Laboratory (LLNL) Environmental Safety & Health *(ES&H) Manual.* Therefore, the D&D Team has developed this SOP to identify the typical hazards that may be encountered on a D&D project, to establish consistent controls, and to document uniform procedures for implementing the controls to ensure safe consistent work practices throughout D&D projects.

The LLNL Integrated Work Sheet (IWS) process is used on all D&D projects to document the project specific hazards, controls, and training. This SOP will be referenced and attached as necessary to the project specific IWS(s), thereby ensuring that the LLNL Environment, Safety & Health (ES&H) manual requirements and the D&D operational requirements work in concert to establish and maintain the necessary safety envelope for a D&D project.

2.0 APPLICABILITY

This SOP will act and serve as the Safety Plan (SP) for all D&D projects, unless otherwise noted. These instructions apply to all D&D personnel who conduct work at Site 300 and the Livermore Site for the ERD.

3.0 REFERENCES

3.1 Lawrence Livermore National Laboratory (LLNL) Environment, Safety, and Health Manual.

3.2 Waste Acceptance Criteria (WAC) (UCRL-MA-115877).

3.3 Department of Energy (DOE) Order 430.1B, Real Property Asset Management.

3.4 DOE Order 413.3A, Program and Project Management for the Acquisition of Capital Assets.

3.5 DOE G 430.1-2, Implementation Guide for Surveillance and Maintenance during Facility Transition and Disposition.

3.6 DOE G 430.1-3, Deactivation Implementation Guide.

3.7 DOE G 430.1-4, Decommissioning Implementation Guide.

3.8 DOE G 430.1-5, Transition Implementation Guide.

3.9 DOE/EM/0383, Decommissioning Handbook.

4.0 RESPONSIBILITIES

4.1 Department Manager (DM)

The DM's responsibility is to ensure that all activities performed by ERD at the Livermore Site and Site 300 are performed safely and comply with all pertinent regulations and procedures, and provide the necessary equipment and resources to accomplish the tasks described in this procedure.

4.2 Decommissioning and Demolition (D&D) Team Leader/Authorizing Individual (AI)

The D&D Team Leader/AI is to ensure that all activities are performed safely and comply with all pertinent regulations and procedures, work is authorized through an IWS, and there is sufficient funding to initiate the work.

4.3 Project Manager (PM)/Responsible Individual (RI)

The PM is responsible for safely executing assigned projects in accordance with this SOP. The PM's responsibilities include completing the initial workforce planning documentation and conducting project management meetings at established intervals from project inception to property disposition. The PM also serves as the IWS RI who follows an established process to ensure work authorization is obtained through an approved IWS.

4.4 D&D Personnel Team

The D&D Personnel Team consists of workers who are qualified and authorized to carry out D&D operations within the confines of the safety envelope established by this procedure and project-specific IWSs, as well as all other applicable ES&H and regulatory requirements.

4.5 SOP Responsible Individual (RI)

The SOP RI is responsible for ensuring that ALL work is performed in conformance with this SOP as well as applicable sections of the LLNL *ES&H Manual.* In the absence of the SOP RI, an individual SHALL be assigned to assume these responsibilities. The Authorizing Individual (AI) for this document is the D&D Team Leader.

The SOP RI SHALL:

a) Review and discuss ANY changes to this document with ALL operating personnel.

b) Upon completion of training, ensure Attachment A, SOP Communication Form, is completed and submitted to the ERD Quality Assurance Office for filing.

c) Ensure each team member is qualified and authorized to perform or assist in performing operations covered within this SOP.

4.5.1 Responsibility Assignment / Delegation

Using this SOP as the controlling basis, the SOP RI or Alternate may assign and/or delegate responsibility to project leaders identified as an RI in a project specific IWS. Where assigned, that individual becomes the Project Responsible Individual (Project RI), accountable for ensuring conformance and compliance for work performed under the controls of this SOP and as outlined in the Authorized IWS.

4.5.2 SOP Variances

The SOP RI may grant written variances to this SOP on a case-by-case basis. Before granting a variance, the SOP RI shall consider the safety significance and consult with the ES&H Team Leader or Deputy, as necessary.

4.6 Communication Flow Process

Attachment B illustrates the communication flow process to be followed on all D&D projects to ensure all decision makers are informed in a timely manner and decisions are communicated in an orderly fashion.

5.0 SCOPE OF PROCEDURE

This SOP addresses the ES&H issues affecting D&D personnel and laboratory personnel in close proximity to D&D activities. It does not consider the health and safety effects to unauthorized personnel willfully challenging either a D&D Project or surrounding D&D access controlled areas.

The content of this document provides project management guidance requirements for D&D activities on buildings that are surplus or excess to LLNL Program needs or those undergoing modification. These activities are broadly defined below:

a) The deactivation process places a building in a safe and stable condition by removing accessible hazardous and radioactive materials to minimize the long-term cost of a surveillance and maintenance program that is protective of workers, the public, and the environment. Typical activities in this process include removal of radioactive material and chemicals as well as isolation of all utilities.

b) The decontamination process includes the removal or reduction of residual radioactive and hazardous materials by mechanical, chemical, or other techniques to achieve a stated objective or end condition.

c) The decommissioning process involves elements of both the deactivation and the decontamination processes and is typically performed in two phases. One phase is programmatic decommissioning, which includes actions taken at the end of the life of a program within a building to retire program related equipment from service. The second phase of the decommissioning process involves facility decommissioning which entails the steps necessary to retire a facility at the end of its useful life in preparation for the

demolition process. Adequate regard for the health and safety of workers, the public, and protection of the environment is used at all times during the process.

d) The demolition process involves removal of any structure, system, or component during the decommissioning phase. The term Demolition may be used to describe activities ranging from removal of a fume hood to destruction of an entire building.

The hazards and controls associated with D&D activities SHALL be evaluated on a project-by-project basis in accordance with approved Integrated Safety Management (ISM) policy utilizing the guidance provided in this document, tailored to mitigate hazards unique to specific projects.

6.0 GENERAL D&D PROJECT REQUIREMENTS

D&D labor resources often support multiple projects simultaneously therefore it is imperative that standard job site practices be employed. This section describes the general project practices or requirements that are employed on all D&D projects managed by ERD. They describe the minimum set of project controls that SHALL be consistently followed. Adherence to these requirements ensures that all members of the D&D project can communicate hazards, implement safety controls, and be cognizant of each other's safety at all times. The general D&D Project Requirements are augmented by additional controls that are required to address specific ES&H hazards and environmental concerns commonly encountered on D&D projects. These additional controls are discussed in Sections 7.0 and 8.0, respectively.

For all D&D projects a disposition plan must be prepared. The disposition plan must integrate ES&H requirements into disposition activities in accordance with DOE STD 1120-98, Integration of Environment, Safety, and Health into Facility Disposition Activities, dated May 1980. The disposition plan should be tailored based on the disposition baseline and disposal method to be used (e.g., reuse, demolition, or decommissioning) and must consider DOE P 455.1, Use of Risk-Based End States and the guidance in the following Guides:

- DOE G 430.1-2, Implementation Guide for Surveillance and Maintenance during Facility Transition and Disposition;
- DOE G 430.1-3, Deactivation Implementation Guide;
- DOE G 430.1-4, Decommissioning Implementation Guide; and
- DOE 430.1-5, Transition Implementation Guide.

In accordance with DOE Order 430.1B, Real Property Asset Management, the disposition plan shall include the following:

(a) A method for identifying, evaluating, and selecting disposition alternatives and long term stewardship (LTS) requirements. Selection of the preferred disposition alternative needs to be documented and be in accordance with relevant regulatory standards. Stakeholder involvement is required in the development of LTS plans.

(b) The identification and completion of required activities related to historical preservation.

(c) A post-closure/post-disposition/LTS records turnover or retention plan.

(d) Surveillance and maintenance plans for facilities and land parcels with residual contamination, hazards, or other conditions that are projected to require post-disposition LTS. These plans must identify appropriate management and funding requirements to ensure ES&H regulatory compliance and meet relevant requirements of treaties, agreements, or other DOE commitments.

(e) A process to track status of LTS actions, including gap analysis of the LTS transition framework to identify actions remaining before end-point conditions are satisfied. This should include a method to periodically reassess monitoring requirements and make any necessary revisions.

(f) Development of specific end-point criteria for declaring disposition complete.

(g) Cost and schedule information for disposition activities and any follow on surveillance and maintenance and LTS requirements must be identified in the Ten Year Site Plan (TYSP).

6.1 Integrated Safety Management

The overarching expectation of management is that all D&D projects fully utilize an ISM approach in the scoping, planning, performing, and closeout phases. This means that all D&D project participants SHALL provide input into project planning and execution to obtain and achieve safe, cost effective project completion.

The primary ISM communication tool used on D&D projects is the IWS. All D&D projects SHALL utilize an IWS containing a scope of work, identification of known or anticipated hazards, and the controls required to mitigate the hazards.

A key element of ISM is prompt communication when an unplanned event occurs. Attachment B provides a flow diagram of the communication process that shall be used by the project team when an unplanned event occurs. This SOP does not authorize the work activities described herein but defines mandatory supplemental controls that are incorporated into the project by reference in the IWS.

In addition, prior to demolition, in accordance with Occupational Safety and Health Administration (OSHA) requirements, Subpart T- Section 1926.850 (Attachment C), a structural engineering survey must be performed to determine the condition of framing, floors, and walls, and any possibility of unplanned collapse of any portion of the structure. Written documentation of the survey must be provided.

6.2 Project Management

To the extent practicable, Project Managers (PMs) shall follow the Facilities & Infrastructure (F&I) Project Management and Project Controls procedures. It should be noted that specific actions taken for a disposition project <u>may</u> be different from a construction project. As such, PMs shall follow the specific procedures for the individual program, such as Transformation Disposition. In that case, PMs shall also refer to the Transformation Disposition Program Management Plan.

6.2.1 Workforce Planning Documentation

The initial activity conducted by the PM is to complete the workforce planning documents. These documents consist of three Excel spreadsheets: Project Pipeline, Resource Loading, and Project Assignments (Refer to Attachment D).

6.2.2 Project Management Meetings

The following are the standard PM required meetings:

- Weekly PM meeting with the integrated project management team to review safety, progress, schedule, production and cost. The PM will submit the submittal status table and register for review at this meeting.
- Monthly internal project review meeting – each PM will present and discuss the variance report for each of their projects using the Monthly Activity Tracking Tool (MATT) format example. An example of this report is included as Attachment E.
- Monthly project reviews with the DOE Federal Project Director – PM will review the draft monthly report from Baseline Accounting Report Tracking Tool (BARTT). The DOE Federal Project Director will provide comments on the report. This report is only used for Facilities and Infrastructure Recapitalization Program (FIRP) or Transformation Disposition (TD) projects.
- Quarterly program reviews with the DOE Federal Program and Federal Project Directors. The PM formally will present the final BARTT reports for the quarter. This report is only used for FIRP or TD projects.

6.2.3 Project Controls

The PM works with the assigned Project Controls scheduler and establishes a resource-loaded baseline schedule at the beginning of each project. The project schedule and budget is then monitored periodically by the project controls scheduler (monthly, quarterly, annually, etc). For projects valued at greater than $100,000, the cost and schedule information is included in the F& I project controls system. For projects less than $100,000, only scheduling is included.

6.2.4 Property Disposition

The Project RI shall ensure that all controlled property is dispositioned prior to moving the property. A clean Sun Flower report will be obtained prior to demolition. This report is proof that no property was inappropriately destroyed. See Attachment F for Property Relocation Requirements.

6.3 Work Authorization

All D&D project work SHALL be authorized for execution through the use of an IWS. At a minimum, each project SHALL proceed as follows to obtain authorization and establish the required controls:

a) An initial roundtable discussion SHALL take place to include the Project RI, the client, D&D Team members, applicable ES&H Team members, and applicable support staff (e.g., utility locators, high voltage, mechanical utilities, materials management, etc.) in order to brief team members on the following:

- The intent and goal of the total scope of work;
- Applicability of this SOP, identification of other relevant controlling documents, and requirements for the IWS;
- Review of current condition of facility (e.g., potential contamination, level of characterization, infrastructure status, neighborhood impact, etc.) AND
- Initiation of a pre-job assessment to address project-specific hazards and controls beyond the scope of this SOP.
- Review of current safety basis documents (Facility Screening Report, Safety Auditing Report, etc.)

Note: Prior to commencing work activities, the RI shall contact the Facility Management Department and/or safety review group to determine if a revision to the safety basis documents is required.

b) Group familiarization site walk down(s) by ALL applicable personnel;

c) Collection and review of associated pertinent historical files;

d) Second roundtable discussion to confirm total hazard control mitigation strategy and implementation/project execution plan. (Note: On some projects this meeting may occur concurrent with the pre-start meeting as determined by the Project RI).

e) A pre-start meeting conducted just prior to the start of work, at the work site, SHALL include:

- Review of the complete scope of work;
- Review of ALL applicable safety plans and controls;
- Review the roles and responsibilities of the staff involved in the work and
- Project communications, posting requirements, Plan Of the Day (POD), Tailgate, and other meetings;
- Review the cost account, schedule, and end state of project and
- Stop Work Responsibilities.

f) Upon conclusion of a successful pre-start meeting the AI SHALL "AUTHORIZE" the IWS enabling work to commence.

g) Once authorization from the AI to proceed with a D&D project has been granted, D&D Project RIs SHALL initiate Daily Tailgate Meetings, which SHALL include the following:

- Daily, the Project RI SHALL prepare or update a Job Hazards Analysis (JHA) and it is to be reviewed at the tailgate meeting.
- A change in the daily work schedule requires a second Tailgate Meeting to ensure that any and ALL changes are evaluated, communicated, and safely controlled.
- Recorded attendance is a compulsory prerequisite to working on the project.

The introduction or discovery of additional or new hazards, or changes in client requirements that modify the agreed upon budget, scope and timeline as defined in the approved IWS, SHALL be treated as a scope change. Changes in the scope SHALL be reviewed by the RI, client, ES&H Team, and approved by the AI. The approved scope change SHALL be documented in the IWS.

6.4 Project Access Control

Unauthorized access to any D&D Project Area by laboratory personnel, or entry into surrounding experimental areas by D&D workers, has the potential for injury and/or illness through inadvertent exposure to hazardous conditions and interference with high- risk activities.

The following controls SHALL be implemented to reduce risks associated with project access control:

a) The exterior of the D&D project work zone SHALL be enclosed to restrict access. Exterior doors to buildings housing the project's work zone but located outside the restricted access areas SHALL be posted: "Notice – Authorized Personnel Only." Doors SHALL be kept closed AND locked but SHALL remain operable from the inside for emergency egress.

b) Access points to project work zones and at various points around the perimeter SHALL be posted with appropriate notification and control signs, e.g., "Notice – Authorized Personnel Only", "Caution Hard Hat Area", and "Danger Demolition Area".

c) Roles and Responsibilities List identifying name, assigned role, responsibility, and contact information.

d) All personnel entering a D&D project shall sign in and out at a designated access control point (i.e., white board near the gate).

e) The fire department, security department and the project Fire Protection Engineer SHALL approve the location of ALL project boundary fencing. Typically, fencing is to be installed no closer than 1.5 times the building height from the walls being demolished.

6.4.1 Access Authorization

D&D workers or pre-authorized Laboratory personnel are allowed access to the restricted access area. Other personnel may be granted access by the Project RI under the following conditions:

Note: The following D&D authorized escort requirements may be waived by the Project RI if the project area(s) is not posted as a Radiological Area (e.g., Buffer Area, Contamination Area, or Radiation Area) or otherwise controlled for exposure or potential exposure to hazardous or radioactive materials

a) Non project personnel and other visitors must have a legitimate business need for access to a D&D Project area. The requestor MUST provide the Project AI with a written request for access with a clearly defined scope and business reason for requesting such access. The approval of the Project AI is required for all non- project personnel and other visitors. Written approval MUST also be obtained from the employee's supervisor if the individual is an LLNL employee.

b) Personnel requiring unescorted access SHALL read AND sign the copy of the SOP and IWS kept at the project "work site".

c) Non-project personnel requiring access into the project site SHALL be briefed on the JHA and access requirements (i.e., PPE and sign in board). The personnel SHALL be escorted to the work area, released to work, and SHALL check out with the Project RI.

d) Escorted access requires an authorized escort from the Roles and Responsibilities List kept at the worksite. Authorized escorts SHALL have completed the training, examinations, and performance demonstrations (on-the-job-training) required for entry to the area and performance of the work. The authorized escort SHALL brief ALL escorted individuals on the area work hazards and the applicable controls.

e) The Project RI SHALL advise the Facility Managers of surrounding area facilities as D&D activities are scheduled adjacent to their facilities.

f) The Project RI SHALL establish a centralized location for the purpose of posting required documents and permits. Typical documents and permits include but are not limited to: IWS, Pre-Task Hazards Analysis (PTHA), SOP, Site Specific Safety Plan (SSSP), Safety basis documents, roles and responsibilities, abatement permits, soil disturbance permits, and demolition permits.

6.4.2 Equipment Operations

The following controls SHALL be implemented to reduce risks associated with equipment operation:

a) No LLNL personnel are to operate non-LLNL owned or leased equipment.

b) No subcontractors are to operate LLNL owned or leased equipment.

6.5 General D&D Project Hazards and Controls

In general, hazards potentially encountered within the D&D project boundaries stem from the following sources:

a) D&D work performed out of sequence,

b) Uncharacterized materials removed without proper review,

c) As well as: fire, falling components, active utilities, ergonomics, debris and/or flying objects, littered and/or congested walking and working surfaces, slippery and/or uneven surfaces, sharp edges, pinch points, working near mechanical equipment, spiders, mice, and/or other vermin.

The following controls SHALL be implemented to reduce risks associated with these sources of general D&D project hazards:

a) D&D personnel SHALL work according to the requirements of this SOP.

b) All D&D work will be executed in the general sequence established by the project schedule and SHALL be executed in the detailed sequence described at the tailgate meetings.

c) Employees SHALL take ALL reasonable precautions to protect themselves and fellow employees, AND to ONLY perform tasks that can, with certainty, be accomplished safely.

d) ALL D&D personnel have STOP WORK AUTHORITY AND are responsible for ensuring that operations are stopped/ceased once unsafe conditions are observed.

6.6 Stop Work Safety Controls

D&D uses two (2) methods to stop work when safety issues arise:

6.6.1 Partial Stop Work

Personnel may request a "partial stop work". A "partial" stop work order SHALL be called when further investigation is required. It could be as simple as two workers working out a solution to a process in a localized area or, it could be more complex which may involve a Subject Matter Expert's (SME) input or a change in work plans.

When a "partial" stop work order is called, work may proceed when the workers' concerns are completely addressed and the RI and/or AI has approved the lifting of the stop work order as appropriate. Note: If a subcontractor is involved, refer to the specification requirements and the stop work provisions within.

6.6.2 Whole Stop Work

Personnel may request a "whole stop work". A "whole" stop work SHALL be called when acts, or failures to act, may cause substantial harm or imminent danger to the environment, or to the health and safety of employees or the public.

When a "whole" stop work order has been called, work CANNOT resume unless jointly concurred by the IWS AI and the ES&H Team Leader or their alternates. Note: If a subcontractor is involved, refer to the specification requirements and the stop work provisions within.

When deemed necessary by the AI, a re-start meeting SHALL be conducted by the Project RI and documented in the IWS. However, Re-start meetings are required under the following conditions:

- Change in Responsible Individual
- Change in Authorizing Individual
- Change in Scope
- After a "whole" stop work order is initiated

6.7 General Employee Responsibilities

ALL employees are responsible for:

a) Knowing and understanding the ES&H requirements of their assignments and the potential hazards in the work area.

b) Participating in ALL required training, personnel assurance, and health monitoring programs, when required.

c) Performing work assignments in full compliance with applicable ES&H requirements in D&D and Laboratory manuals, guidelines, and established safety plans including:

- Immediately correcting or informing the responsible manager of any ES&H related-problems
- Warning fellow employees of hazards
- Placing defective equipment out of service and notifying Project RI
- Knowing emergency plans and procedures for the work area and
- Reporting ALL work-related injuries and illnesses to D&D management and the HSD.

6.8 Personal Protective Equipment (PPE)

To enter an active D&D area the following minimum PPE is required:

Note: The hard-hat requirement may only be removed with approval from the Industrial Safety Engineer.

- Hard hat
- Safety shoes or stout work boots
- Safety glasses with side shields
- Long pants
- Short sleeve shirt providing full coverage of the torso
- Type II high visibility vests with reflective tape shall be worn when heavy equipment is present at the project site.
- Additional PPE for specific D&D activities as required and identified in the IWS.

6.9 General Health and Safety Controls

a) The two-person rule applies during ALL D&D operations, unless work-alone is authorized by the Project RI.

Prior to the authorization of work-alone operations, the Project RI SHALL evaluate the hazards of each activity that could be classified as "hazardous-for-working-alone". Contact the assigned H&S Technician or designee for assistance in analyzing the hazards and controls for specific types of work. Authorized work-alone staff SHALL maintain radio contact with the work supervisor until completion of the activity. Periodic radio check-in intervals SHALL be established. In keeping with ISM, work alone authorization SHALL be kept to a minimum. Non-hazardous work in office areas is exempt from this requirement.

b) Walkways and work areas SHALL be kept free of debris and non-essential tools.

c) Gloves SHALL be worn to protect hands against pinching, abrasions, and cuts when handling materials or equipment.

d) Fire permits SHALL be obtained when doing work that creates sparks or flames (e.g., some cutting, grinding, welding or torch work).

e) Eating, smoking, drinking, and applying cosmetics is restricted to break areas only (unless an exemption is granted by the SOP RI and ES&H Deputy Team Leader).

f) During the initial phases of facility deactivation/demolition, ALL safety systems (i.e., evacuation page) SHALL be identified and labeled. This is done to ensure these systems remain on-line and are not removed until the determination is made to do so. For more information, refer to Section 7.19, *Fire Safety and Fire Department Access*.

g) The ES&H Industrial Hygienist (IH) SHALL conduct a site walk through/inspection for existing biohazards and pest control issues at the beginning of each job and periodically throughout the job. The potential exposure of workers to spiders, mice, or other vermin SHALL be addressed by utilizing pest control as warranted by site conditions. The presence of animal droppings, such as pigeon droppings or mice droppings at a job site introduces the potential hazard of Hanta Virus Pulmonary Syndrome and other serious diseases. If animal droppings are identified as a hazard during the biohazard/pest control walk through, the IH SHALL generate any necessary Hazards Assessment and Control

(HAC) documents or procedures to ensure the proper clean-up and disposal of the animal droppings.

h) If abandoned sharps are discovered during the course of work, ensure they are placed in a sharps disposal container and disposed of according to the instructions of the Environmental Analyst (EA) and other ES&H disciplines, as appropriate.

i) Before buildings are peeled, (e.g., non load bearing walls demolished, case work removed, tile removed, etc.) line location SHALL be employed and completed. The perimeter of the entire work site SHALL be scanned to locate all underground utilities that may be adjacent, pass through or exit the work site. The marked locator lines SHALL be maintained as the building is being peeled to insure all buried utility line locations remain clearly identified throughout the D&D process. In the event the locator line is removed, the line must be reapplied until the hazard is abated.

6.10 Color Coding

One of the most important communication tools employed on D&D projects is the marking of utilities and hazards within the project boundary. Two color code systems are used. The first is the national standard underground utility identification color code. It is used to identify the type of utility (electric, water, gas, etc.) that is below grade. This system stops at grade level, usually at the first projection above grade. It is used to mark the location of utilities prior to excavation. Underground service locators apply the color code to the ground surface along the route that the utility takes within the project boundary.

The second color code system is unique to D&D and is used to communicate two types of information: the presence of hazards (either confirmed or suspected) and the authorized disposition path (unrestricted release or released to landfill only). The D&D system applies only to above grade Structures, Sub-systems, and Components (SSC). The D&D team waste release protocols are presented in Attachment F.

6.10.1 National Standard Underground Utility Identification Color Code

The following is the national standard color code system for marking underground utilities within the D&D project boundary and within 25 feet of proposed excavations outside of the project boundary. With the exception of white, these markings are applied by the underground service locator provider. The Project RI is responsible for ensuring the application of white paint to mark the project excavation area.

National Standard Underground Utility Color Code System			
RED	Electrical	YELLOW	Gas-Oil-Steam
ORANGE	Communication CATV	BLUE	Water
GREEN	Sewer	PURPLE	Reclaimed Water
PINK	Temp. Survey Markings	WHITE	Proposed Excavation

6.10.2 D&D Above Grade Color Coding

CAUTION:

Both the D&D and Underground Utilities codes use the colors RED, GREEN, BLUE and YELLOW.

- The D&D colors are applied to above ground Structures, Sub-Systems, and Components (SSCs).
- The Underground Utilities colors are applied only to structures and excavation surfaces.
- Use of the National Standard color-coding inside a facility must be annotated in black to distinguish between the D&D color code and the National color code.
- The Project RI or designee SHALL inform the D&D workforce of the specific meanings of such color-coded markings to preclude any misunderstandings.

Note 1: Disposal of used spray cans SHALL comply with the Bay Area Air Quality Management District (BAAQMD) or the San Joaquin Valley United Air Pollution Central District (SJVUAPCD) requirements, as appropriate. Contact the project Radiological and Hazardous Waste Management (RHWM) technician for disposal instructions.

Note 2: Upon receiving the analytical results, the H&S Technician shall:

1. *Log and file the results with applicable property release forms in the project binder; and*
2. *Notify the RI.*

The RI shall:

1. *Obtain written guidance from the EA regarding waste release instructions (i.e., ok for reuse/recycle or landfill only).*
2. *Brief the Craft Superintendent and workers on the proper color code to apply (blue or green) after they remove the physical hazards.*

D&D utilizes a color code to identify the status of SSCs slated for removal in D&D activities. Prior to commencing D&D activities, the RI SHALL assemble a multi-disciplinary team to tour the work area, evaluate and color code ALL SSCs. The D&D color code is as follows:

a) **Red** paint is applied when a known hazardous material exists on or inside a SSC. Where applied, removal of the SSC cannot occur until the H&S Technician has changed the color to Green or Blue. The appropriate craft personnel may also change the color of the material with permission of the Project RI. Before changing the color code of an SSC painted Red, the H&S Technician or appropriate craft personnel SHALL consult with the Project RI, ES&H Team Disciplines, RHWM Lead, and the EA to verify that ALL safety,

health, environmental, and waste issues are properly incorporated into the removal and disposal plan and SHALL obtain a copy of the waste release memo issued by the EA.

An example of an SSC that may change colors is the electrical system conduit and panels. They are painted **Red** at the beginning of the project while power is still available in the facility. **Black** is used to annotate the electrical status of the component (**"HOT"** means it is energized and **"NOT HOT"** means that the power has been verified to be isolated AND air gapped). Once power has been isolated, the conductors removed, analytical data reviewed, and the EA has issued a waste release memorandum, the color can be changed to either **Green** or **Blue**.

b) **Yellow** paint is applied to SSCs denoting a suspected hazardous material requiring confirmatory sampling. Where applied, investigation and sampling are required to ascertain satisfaction of characterization to an acceptably known certainty. Yellow-labeled material can be removed with prior approval from the H&S Technician and RI. The appropriate craft personnel may also change the color of the material with permission of the Project RI. The H&S Technician or appropriate craft personnel SHALL obtain and log the sample results in the project files and obtain a copy of the waste release memo from the EA before authorizing removal of the SSC. If the results are negative for hazardous material, the H&S Technician SHALL change the color from Yellow to **Green** or **Blue** before the SSC is removed. An example of a yellow labeled SSC cleared for removal without a change in color is asbestos-containing materials.

c) **Blue** paint is applied to SSCs indicating the material requires controlled disposal at a Municipal Landfill (non-recyclable). Blue paint SHALL NOT be applied to energized systems. Before painting an SSC Blue the H&S Technician or RI SHALL obtain a copy of the waste release memo from the EA.

d) **Green** paint is applied to SSCs indicating that ALL ES&H issues of concern have been addressed, the material is safe for removal, and that it can be reused or recycled if applicable. Green paint SHALL NOT be applied to energized systems. Before painting an SSC Green the H&S Technician or RI SHALL obtain a copy of the waste release memo from the EA.

e) **Black** paint is applied to SSCs for marking identification purposes (i.e., editorials and instructions).

The Project RI SHALL obtain a written variance from the SOP RI if deviation from the color code system is necessary.

6.11 Staging Area

Equipment and debris removed during D&D activities may require temporary staging in a controlled designated holding area pending characterization to determine its release status. Such an area SHALL be referred to as a "Staging Area".

A Staging Area SHALL be established and controlled under the following requirements:

a) The D&D Project RI SHALL discuss the need and the proposed location for the Staging Area with the ES&H Team to identify concerns, requirements, and site-specific controls,

b) The Project RI SHALL assign an operator to each staging area,

c) The operator is responsible for overseeing day-to-day operations and activities performed at the Staging Area. This responsibility includes:

- Receiving equipment and debris from project area
- Maintaining an inventory of materials and equipment stored in the Staging Area
- Coordinating the sampling of equipment and materials, as necessary
- Obtaining prior review from the AI prior to performing dismantlement work in the Staging Area
- Preparing equipment and materials for transportation to the Waste Accumulations Area (WAA), the municipal landfill, Donation Utilization and Sales (DUS), or elsewhere as per the ES&H Team's guidelines
- Maintaining documentation associated with the Staging Area operations and activities

d) The operator SHALL post an Authorized Access List at the Staging Area;

e) The Staging Area SHALL **NOT** be used for the storage of known contaminated materials. If known contaminated material requires disassembly in order to characterize the waste, the disassembled components are to remain in the vicinity of its original location and SHALL be labeled as "Characterization Pending" until characterization is complete and it can be moved to the appropriate holding area;

f) If characterization determines that an item in the Staging Area is to be controlled as hazardous or radioactive waste to be disposed through RHWM, that item SHALL be transferred to the project WAA by the end of the working day;

g) ALL liquids SHALL have secondary containment AND

h) Upon completion of the project, the Staging Area SHALL be closed according to ES&H Team recommendations.

6.12 Hazardous Materials

There is a potential for employees to be exposed to hazardous materials via injection, absorption, inhalation, or ingestion while performing D&D operations.

Workers may be exposed to toxic dusts generated by D&D activities. Dusts generated may contain toxic components (e.g., asbestos, lead, beryllium, chromium, and crystalline silica). Exposures to toxic dust may result in serious illness.

Workers may be exposed to numerous toxic metals (lead, cadmium, mercury, chromium, nickel, beryllium, etc.), which may be suspect human carcinogens and are generally toxic to the lungs and kidneys.

The following controls SHALL be implemented to reduce risks associated with hazardous materials:

a) Activities involving hazardous and/or toxic materials may require exposure monitoring. Monitoring SHALL be determined on a job-specific basis in consultation with the ES&H Team IH.

b) Workers SHALL thoroughly wash their hands, arms, and faces upon exiting the work area.

c) Eating, drinking, smoking, chewing (gum or tobacco), or applying lip balm or cosmetics are not allowed in the work area if hazardous materials are known or suspected to be present.

d) Job-specific PPE SHALL be listed in the IWS or attached safety documentation.

e) Equipment, piping, and utility disassembly introduce the possibility of a spill of potentially contaminated solids and liquids. When there is the possibility of spillage, double containment SHALL be used. The appropriate spill kit or spill cleaning supplies for the potential contaminant SHALL be maintained nearby. An example of double containment is a photo tray on top of a larger sheet of plastic. Collected solids and/or liquids should be appropriately containerized and subsequently managed by the RHWM Technician unless otherwise arranged with the EA.

f) Hazardous material issues SHALL be resolved prior to the facility being demolished.

g) If contract labor personnel are to be involved in handling potentially hazardous (or radioactive) material, proposed operations, hazards, and controls must be reviewed by the contract company's health and safety support as part of the subcontractor's Site Specific Safety Plan (if required). The ES&H Team prior to the subcontractor starting work SHALL review the SSSP. If discrepancies exist, issues of concern must be addressed before work can begin. A pre-start meeting SHALL be held with the subcontractor to cover hazards and controls as well as site access.

6.13 Respiratory Protection

The need for respiratory protection SHALL be determined by the ES&H Team IH, and documented in an approved Hazards Assessment and Controls (HAC) form. Respiratory protection may be used for comfort if requested by an employee. However, the following conditions apply whenever respirators are used:

a) An approved HAC SHALL be in place for the task being performed.

b) If one member of the team wears a respirator then all members of the team working in the immediate area SHALL wear a respirator.

c) A Respirator SHALL be worn any time concrete or asphalt is disturbed unless the ES&H Team IH provides written exception to the Project RI who concurs with the determination.

d) Respirators SHALL be thoroughly cleaned by the user, inside and out, before being placed into respirator storage bags.

e) Respirators SHALL be stored in a cool, dry location when not in use.

f) Respirators SHALL be exchanged at intervals determined by the ES&H Team IH, unless contamination occurs or excessive breathing resistance/flow rate drop is noted.

g) Respirators SHALL be monitored or decontaminated and surveyed by the H&S Technician prior to their return to Respirator Services.

h) The H&S Technician SHALL be notified of any respirator contamination. Contaminated respirators SHALL be segregated and evaluated to determine whether they should be disposed of as waste or decontaminated.

i) If powered air-purifying respirators are used they SHALL be tested for adequate airflow before each usage, by the user or by the H&S Technician. Adequate airflow maintains positive pressure in the face piece while worn.

7.0 HAZARDS ANALYSIS AND CONTROLS

Hazards and controls applicable to most, if not all, D&D projects are described in the sections below. Project-specific hazards and controls not covered here SHALL be addressed on a case-by-case basis in the IWS.

It is the intent of this section to provide a brief overview of the hazards typically encountered on D&D projects and the IWS controls used to mitigate the hazards. If a conflict arises between the controls listed in the IWS and this SOP then a stop work SHALL be issued for those areas affected by the conflicting information until the Project RI, AI, and ES& H Team disciplines can resolve the conflict. The Project RI SHALL document the stop work in the IWS log and SHALL process a Lesson Learned.

7.1 Asbestos-Containing Materials

Asbestos-containing materials (ACM) and presumed asbestos-containing materials (PACM) may be present in facilities/trailers that are to be decontaminated, demolished, or excessed. Asbestos fibers may be released during ACM or PACM removal activities, during other work that may disturb ACM or PACM, or doing work in areas where ACM or PACM has deteriorated or been damaged. The primary exposure pathway is inhalation of airborne asbestos fibers that may cause asbestosis and/or increased risk of developing lung cancer or Mesothelioma. Intact ACM is not a health hazard unless it is deteriorated or disturbed to the extent of making it friable (causing loose fibers to become airborne).

The following controls SHALL be implemented to reduce risks associated with asbestos-containing materials:

a) The ES&H Team IH SHALL work with the Project RI to determine the status of ALL ACM and PACM in ALL facilities/trailers to be decontaminated or demolished. The

investigation SHALL employ techniques to ensure that all layers of material have been exposed for sampling (e.g., multiple finish and sub floor layers may exist).

b) Representative bulk sampling of ALL ACM and PACM, including floor material, wallboard, surfacing material, roofing material, and thermal insulation, SHALL have been or SHALL be taken to ensure the facility has been characterized.

c) ALL ACM SHALL be identified, labeled, and spray painted yellow OR the facility SHALL be declared "asbestos free," if no asbestos is present.

d) ALL damaged ACM and PACM that has become friable, become a health hazard or can become airborne SHALL be immediately identified, labeled AND isolated. This ACM/PACM SHALL then be repaired, abated or put into a state that is no longer a hazard to D&D workers.

e) ALL operations pertaining to ACM or PACM must be performed in accordance with existing OSHA regulations and Document 14.9, "Safe Handling of Asbestos-Containing Materials during Construction Work" of the *ES&H Manual.*

f) A work permit SHALL be obtained for all ACM or PACM abatement work.

g) In addition to the PPE described in Section 6.8, the minimum additional PPE for ACM or PACM abatement on D&D projects SHALL consist of Anti-contamination clothing (cover alls, booties, gloves, and hood) and respiratory protection.

7.2 Lead-Containing Materials

Lead-based paint and other lead-containing materials (e.g., lead shielding, lead bricks, galvanized metal, etc.) may be present in facilities/trailers that are to be decontaminated, demolished, or excessed. Airborne lead and lead-containing dust may be released during activities such as lead abatement, demolition, cutting, sawing, scraping, abrasive blasting, and sanding painted surfaces. The primary exposure pathways are inhalation and ingestion.

The following controls SHALL be implemented to reduce risks associated with lead-containing materials:

a) The ES&H Team IH SHALL work with the Project RI to determine the status of ALL potential lead-based paint and other lead-containing materials in ALL facilities/trailers that are scheduled for decontaminated or demolition.

b) ALL lead-based paint and other lead-containing materials SHALL be identified. Representative bulk sampling of ALL potential lead-containing materials, including paint, roof flashing, soundproofing, shielding, and plumbing fixtures, SHALL be taken to ensure the facility is fully characterized.

c) A facility/trailer SHALL be declared "lead free," if no lead-based paint or other lead-containing materials are present.

d) ALL operations pertaining to lead-based paint and other lead-containing materials must be performed in accordance with existing OSHA regulations and Document 14.10, "Safe

Handling of Lead and Lead Compounds in General Industry and Construction Operations" of the LLNL *ES&H Manual*.

e) A work permit SHALL be obtained for all ACM or PACM abatement work.

7.3 Mercury

Mercury may be present in facilities that are to be decontaminated, demolished or excessed. The primary hazards from metallic mercury arise from inhalation of mercury vapors and skin contact where mercury can pass through the skin. Mercury targets the respiratory system, central nervous system and kidneys. The maximum 8-Hour Time Weighted Average (TWA) airborne mercury vapor exposure allowed (without respiratory protection) is 0.025 mg/m^3. The peak airborne mercury vapor exposure concentration allowed (without respiratory protection) is 0.1 mg/m^3. Overexposure to mercury vapor can yield symptoms ranging from coughing to chest pain and despondency. A secondary hazard from metallic mercury originates from ingestion. Ingestion of significant amount of mercury can result in symptoms ranging from nausea and abdominal pain to vomiting and diarrhea.

The following controls SHALL be implemented to reduce risks associated with mercury hazards:

a) Avoid skin and eye contact. Use plastic or rubber gloves when handling small quantities of metallic mercury. If exposure to the face may occur, wear splash-proof goggles and a face shield unless full-face respiratory protection is being used.

b) Wash hands and face after handling mercury, before lunch or breaks, and at the end of the workday.

c) The H&S Technician SHALL be notified if any mercury is visually detected.

d) The H&S Technician SHALL monitor for mercury vapors whenever the potential for personnel exposure has been identified.

e) When working on piping systems suspected of containing mercury, contact the ES&H Team IH for task-specific instructions. The following precautions are recommended:

- Whenever possible, place a catch basin made of smooth impervious materials (such as plastic or smooth-finish paint), large enough to contain the greatest amount of mercury that could spill and have sufficient dimensions to catch mercury droplets escaping from any plausible direction.
- Felt mats or horsehair mats can be put on seamless plastic sheets laid in catch pans to catch the droplets from mercury spills. The droplets can then be collected by simply wrapping up the plastic with the mat still inside and disposing of it as mercury waste.
- Pre-stage the mercury High Efficiency Particulate Air (HEPA) filtered vacuum cleaner and mercury spill kit for quick deployment to the pipe separation area.
- Avoid heating pipes that may contain mercury. If torch cutting or similar operations are required, contact the ES&H Team IH for a task-specific hazard analysis prior to beginning work.

- Avoid walking on or touching surfaces contaminated with mercury.
- If a mercury spill can not be cleaned up immediately, establish an exclusion area and post it with CAUTION signs stating, "Mercury Spill Area-Keep Out."

7.4 Mold

Workers may be exposed to various molds and fungi during D&D activities. Molds can be found almost anywhere, growing on virtually any organic substance as long as moisture and oxygen are present. It is impossible to eliminate ALL molds and mold spores indoors. However, controlling moisture indoors can control mold growth. ALL molds have the potential to cause health effects. Some produce allergens that can trigger allergic reactions, others can produce potent toxins and irritants.

The following controls SHALL be implemented to reduce risks associated with mold exposure:

Do not touch mold/moldy items with bare hands.

a) Do not get mold or spores in eyes.

b) Do not disturb mold growth.

c) Use wet vacuum to collect standing water.

d) Contact the ES&H Team IH for specific recommendations on remediation and control. ALL remediation SHALL be performed under the guidance of a HAC. At a minimum, Nitrile gloves, safety glasses, and a half face air purifying respirator with P100 cartridges SHALL be worn during mold clean-up activities.

e) Wet porous materials SHALL be discarded, regardless if mold growth is visible.

f) Establish an exclusion area and post it with CAUTION signs stating, "Mold In Area-Keep Out."

7.5 Radioactive Materials

Facilities and equipment that were used for operations involving radioactive materials may contain radioactive contamination. Alpha, beta, and gamma emitting radioactive materials may be inside, behind, and/or under casework, within hood remnants and HVAC ducting, under paint and tile, and on other surfaces not previously accessed during earlier building surveys. There is the potential for workers to come in direct contact with contamination or cause the contamination to become airborne. The primary exposure pathways are inhalation, ingestion, absorption, and injection through the skin.

The following controls SHALL be implemented to reduce risks associated with radioactive material hazards:

a) The contamination history and most recent surveys of the facility and/or equipment SHALL be reviewed by the ES&H Team Health Physicist (HP) to aid in creating health physics monitoring and control plans that implement the requirements of 10 CFR 835 and the LLNL *ES&H Manual*.

b) Monitoring and control plans (i.e., hazard assessments or controls delineated in an IWS) SHALL include specifications for the following:

- Characterization surveys when sufficient contamination information and/or facility closeout surveys are not available. Such surveys should typically be conducted prior to the commencement of facility D&D activities;
- Surveys of building and equipment surfaces that become exposed during the removal of Real Property and Installed Equipment (RPIE), casework, floor tiles, etc;
- Personnel and area monitoring and controls for D&D activities that may encounter radioactive materials or contamination and
- Equipment and material survey and release plan (e.g., Sampling Plan), prepared in conjunction with the ES&H Team EA.

c) Monitoring and procedural controls SHALL ensure ALL doses to personnel are kept within established guidelines and maintained as low as reasonably achievable (ALARA).

d) Personnel accessing the D&D projects SHALL adhere to ALL radiation postings.

e) ALL Radiological Areas, as stated in Document 20.2, "LLNL Radiological Safety Program for Radioactive Materials" of the *ES&H Manual*, SHALL be kept under the control of the D&D Project H&S Technician or kept locked to prevent unauthorized access.

f) Items surveyed and found to be radiologically contaminated above 10 CFR 835 Appendix D values SHALL be labeled as described in Document 20.2, "LLNL Radiological Safety Program for Radioactive Materials" of the *ES&H Manual*.

g) Areas (such as portions of walls, casework, floors) surveyed and found to be radiologically contaminated above 10 CFR 835 Appendix D values SHALL be clearly marked by the D&D Project H&S Technician and annotated with the level of contamination and if it is fixed or removable.

h) The D&D Project H&S Technician SHALL be informed of tours through Radiological Areas involving non-D&D personnel.

i) With the exception of Class I and Class II sealed sources, the D&D Project H&S Technician SHALL be informed of any plans to bring radioactive material or radiation generating devices into D&D project sites.

7.5.1 External Dosimetry Requirements

a) Personnel working with radioactive material or performing radiological decontamination activities SHALL be on a quarterly (minimum) whole body Thermo Luminescent Dosimeter (TLD) exchange cycle.

b) Extremity TLD and additional dosimetry requirements SHALL be evaluated and implemented on a case-by-case basis by the assigned HP.

7.5.2 Internal Dosimetry Requirements

a) Prior to work with or around radioactive materials, contaminated equipment or areas, or potentially contaminated equipment or areas, the ES&H Team HP SHALL assess and advise the Project RI on the need to submit baseline urine samples and have a lung and whole body scan. If these activities are necessary the ES&H Team HP SHALL ensure that they are identified as controls in the IWS.

b) Personnel routinely handling radioactive material or contaminated items SHALL be on a quarterly (minimum) urine bioassay cycle and an annual whole body/lung count.

c) Upon termination of D&D operations specified in 7.5.2 (a); a termination bioassay and whole body/lung count is required.

d) Additional bioassay requirements SHALL be evaluated and implemented on a case-by-case basis by the assigned HP.

7.5.3 Radiological Practices

Good radiological techniques SHALL be practiced to avoid the potential spread of contamination and maintain radiation exposures ALARA. These techniques include, but are not limited to:

a) Frequent use of contamination detection instrumentation to check hands, tools, or areas during and after work with contaminated or potentially contaminated equipment.

b) Being aware of contact radiation levels of the materials that are being handled or worked around by using radiation detection instrumentation available in the area, and taking appropriate steps to reduce personal radiation exposure (limit time, increase distance, use approved shielding).

c) Changing or removing of contaminated gloves before touching or handling uncontaminated equipment, tools, radios, etc.

d) Operations that produce airborne radioactive material (i.e., brushing, grinding, sweeping, etc.) SHALL be avoided if possible and practical. If such operations are required, they SHALL be performed with local High Efficiency Particulate Air (HEPA) negative air exhaust or airborne suppression techniques.

e) Contaminated or potentially contaminated equipment, tools, or materials SHALL be marked or labeled as contaminated (or potentially contaminated, as appropriate) and stored separately from non-contaminated tools.

f) Minimizing the amount of material or equipment brought into a potentially contaminated area.

g) Ensuring that potentially contaminated material/equipment to be released for unrestricted use is surveyed and the results documented by trained and qualified individuals.

h) The use of secondary containment during activities where radiological contaminated dispersible materials or liquids may be encountered or produced, such as the dismantlement of suspected contaminated equipment. An example of double containment is a photo tray on top of a larger sheet of plastic.

i) Whenever radiological contaminated liquids are anticipated or encountered, a spill kit SHALL be in the immediate vicinity of the activity. The contents of the spill kit SHALL include a sufficient number of absorbents, as determined by the ES&H Team H&S Technician based on the potential amount of liquid that could be spilled.

j) Additional contamination and exposure control procedures will be specified in the job-specific monitoring and control plans as detailed above.

When radiological airborne monitoring is deemed necessary by the ES&H Team Health Physicist and/or EA, analytical results SHALL be forwarded to the Terrestrial and Atmospheric Monitoring and Modeling (TAMM) group, per the EA's discretion. TAMM personnel SHALL evaluate the emissions data to ensure D&D compliance with NESHAPs requirements.

7.6 Beryllium

Controlling beryllium exposure has been a major interest of the DOE for many years. Beryllium and beryllium compounds should be considered potentially harmful. Beryllium and its compounds are classified as human carcinogens. The ultimate goal is to eliminate chronic beryllium disease from all DOE facilities by: controlling exposures; minimizing the number of workers exposed; and minimizing the opportunities for exposure. All beryllium work shall be controlled to minimize the opportunities for exposure to beryllium and the number of workers exposed. Controls, in the order of priority are: engineering controls, administrative controls, and PPE.

All work activities involving beryllium shall be authorized with an IWS or IWS with a Safety Plan (SP) or other work authorization document. The hazard assessment that is performed as part of the IWS process shall determine the controls necessary to keep airborne exposure below the Action Limit (AL) and as low as possible. A stop work SHALL be called if airborne levels exceed 50% of the AL (Refer to Table 1). The purpose of the work stoppage is to determine if procedures and practices can be modified to reduce airborne levels and, if necessary, to put in place an Exposure Reduction and Mitigation Plan. ES&H Manual Document 14.4 "Working Safely with Beryllium" is to be adhered to by all D&D projects.

Table 1. Standards and Limits for Occupational Exposure to Airborne Beryllium

Standard	Limit	Source
Action level (AL)	0.2 μg Be/m^3 time-weighted average concentration[a]	10 CFR 850.23
Permissible exposure limit (PEL)	2 μg Be/m^3 time-weighted average concentration[a]	10 CFR 850.22 29 CFR 1910.1000
Acceptable ceiling concentration	5 μg Be/m^3 [b]	29 CFR 1910.1000
Peak above acceptable ceiling	25 μg Be/m^3 for 30 minutes[b]	29 CFR 1910.1000

[a] **Measured without regard to the use of respiratory protection.**

[b] **For soluble compounds not subject to 10 CFR 850.**

7.7 Noise

Operators and support personnel may be exposed to high noise levels during D&D operations. Exposure to high noise levels may result in permanent noise-induced hearing loss.

The following controls SHALL be implemented to reduce risks associated with noise hazards:

a) Personnel in areas exposed to noise levels in excess of the American Conference of Governmental Industrial Hygienists (ACGIH) Time Weighted Average (TWA) Threshold Limit Value (TLV), 85 decibel (dBA), SHALL be enrolled in a Hearing Conservation Program and receive appropriate training.

b) Hearing Protective Devices (HPDs) SHALL be worn as applicable where noise exposure may be in excess of the ACGIH TLV.

c) The ES&H Team SHALL make arrangements to conduct site and equipment specific noise evaluations prior to the start-up of each operation, as applicable. If exposure levels are in excess of the ACGIH TLV, engineering noise control measures SHALL be evaluated for feasibility. If engineering noise control measures are NOT feasible, restrictions on allowable operating (exposure) times or HPDs SHALL be implemented. Necessary engineering noise control measures and hearing conservation controls SHALL be added to documentation.

d) Hearing Protective Devices (HPDs).

- HPDs SHALL be used in strict accordance with the manufacturer's instructions and SHALL NOT be modified.
- HPDs SHALL be stored in a clean and dry location when not in use.

  Reusable HPDs SHALL be inspected before each use. Damaged or defective HPDs SHALL be replaced immediately.
- Reusable HPDs such as circumaural muffs SHALL be thoroughly cleaned, inside and out, before storage. HPDs SHALL be disinfected before use by another wearer.

7.8 Nuisance Odors, Dust, and Noise

There is a chance for nuisance odors, dusts, or noise to affect both D&D Project personnel and non-project personnel in the surrounding area. Nuisance odors, dusts, or noise are defined as those that are of levels below regulatory guidelines or permissible limits yet cause discomfort for, or interfere with, the worker's tasks.

The following controls SHALL be implemented to reduce risks associated with nuisance odor, dust and noise:

a) When discomfort is encountered due to nuisance odor, dust, and/or noise, contact the H&S Technician for immediate assistance. The H&S Technician SHALL investigate the problem and will either correct it or call the ES&H Team IH, as necessary.

b) Water spray SHALL be used to control dust during demolition activities. Water SHALL be applied in a manner that prevents the runoff of dust control water into the storm drainage system. Additional dust reducing practices, such as stabilized entrances to the D&D project, control of ingress and egress points and road cleaning SHALL also be employed, where necessary, to mitigate dust nuisances.

7.9 Confined Spaces

Operations may take place in a confined space as defined in Document 18.7, "Working in Confined Spaces" of the *ES&H Manual.* Personnel may be exposed to oxygen-deficient and/or contaminated atmospheres. Work in these atmospheres may cause serious injury or death.

The following controls SHALL be implemented to reduce risks associated with confined space hazards:

a) Work in a confined space SHALL be in accordance with the controls found in Document 18.7, "Working in Confined Spaces" of the *ES&H Manual.*

b) Notify the H&S Technician prior to confined space entry.

c) An excavation of any depth can become a confined space. Contact the H&S Technician prior to entry.

7.10 Material Handling

Material handling accidents can result in serious or fatal injury. A common injury in materials handling involves the back. Back injuries often result from lifting too heavy a load, or by using an unsafe lifting method. Materials can be dropped from elevation, tipped over, or slip, striking personnel and causing injury.

The following controls SHALL be implemented to reduce risks associated with material handling hazards:

a) Material handling aids (e.g., casters or ramps) should be utilized whenever material or container weight exceeds 50 lbs.

b) Personnel SHALL not push or pull a load that exceeds 600 lbs.

c) Personnel utilizing lifting equipment SHALL be properly trained. The use of material handling equipment for disassembly or movement of equipment may require a work plan that SHALL be reviewed by the Industrial Safety Engineer (ISE).

7.11 Rigging, Hoisting, and Lifting Operations

LLNL employees using crane or hoisting equipment on D&D projects SHALL possess a current appropriate LLNL operator's license or be otherwise qualified according to industry standards.

The Project RI SHALL ensure all elements of the LLNL ES&H manual, Document 15.3 *Crane, Hoist, and Rigging Safety* are addressed during the planning stages of each project, and the controls are implemented during project execution. A qualified Rigging expert shall be part of the integrated project team from planning through execution.

D&D Project RIs SHALL not act in the capacity of the Qualified Rigging expert on projects where they are the RI, or Alternate RI.

The Project RI SHALL ensure all subcontractor personnel (excluding supplemental-labor and labor-only workers) operating or hoisting or rigging equipment on D&D projects are prior reviewed and approved by LLNL SMEs. The Project RI SHALL ensure that a record of the review is documented and forwarded to the contract administrator for inclusion in the official contract record.

7.12 Power-Driven Tools and Equipment

Serious injury may result from incorrect usage of industrial power-driven tools and equipment. If improperly maintained or operated, these tools can be a source of injury to personnel. Use of power-driven tools can expose personnel to the hazards of flying objects, sharp edges, pinch points, etc.

The following controls SHALL be implemented to reduce risks associated with power-driven tools and equipment:

a) The operator SHALL be trained prior to operation of industrial equipment. This training SHALL include job-specific training on the use, potential hazards, and required controls to ensure safe operation of the equipment.

b) A pre-operational check and a start-up check SHALL be completed by the equipment operator prior to equipment use. It is recommended that a post-operational check be completed as appropriate, in order to maintain the equipment in a mechanically sound condition in advance of the next operation. Checklists SHALL be developed and maintained current for the equipment and operations by the Equipment RI or designee.

c) Equipment requiring pressure exceeding 150 psi SHALL be evaluated prior to use by a High-Pressure inspector. The Project RI SHALL contact the High Pressure inspector for this evaluation.

d) Protective clothing and equipment, as identified in the IWS SHALL be worn to protect the worker. Changes to the specified PPE require advanced authorization by the appropriate ES&H Team discipline(s).

7.13 Trips/Falls/Working at Heights

Trip/fall hazards can be created by hoses, electrical cords and other items. In addition, wet surfaces or plastic laid down on floors can create slip hazards. When working at heights, there is a potential for injury due to falls.

The following controls SHALL be implemented to reduce risks associated with trips/falls/working at heights:

a) Hoses, electrical cords and other items used SHALL be laid out in a manner reducing the potential for trip/fall injuries. ALL hoses and electrical cords SHALL be protected against damage, i.e., being driven over by motor vehicles.

Hoses and electrical cords that are placed across egress or walking paths SHALL be clearly marked and placed in temporary cable runs.

b) Herculite sheeting or equivalent SHALL be used to cover the floor. Plastic sheeting is NOT approved for use when covering the floor.

c) Spills SHALL be cleaned-up by a qualified person as soon as they are identified.

d) Appropriate fall protection equipment SHALL be employed whenever working at heights greater than 6 feet or within 50 feet of an unguarded ledge (with a fall potential greater than 6 feet). Handrails SHALL be installed on the roof edge wherever practical when disassembly and demolition of roof equipment is required. The ES&H Team Industrial Safety Engineer SHALL evaluate fall protection requirements on a case-by-case basis and establish controls.

e) A work surface, that can be adjusted vertically (e.g., scaffolding and personnel lifts) SHALL be available to allow work from the waist to shoulder height. Work performed on ladders SHALL be limited to those areas where personnel lifts or scaffolding cannot be used.

f) Demolition and disassembly of equipment on the roof or intermediate floors can create holes. Any holes equal to or greater than 2 inches in the least dimension SHALL be covered, with the cover secured in place and the word "HOLE" clearly written on the cover. The material used to cover the hole shall be capable of supporting at least twice the weight of employees, material, and equipment that may be imposed on the cover at any one time (reference OSHA 1926.502(i)).

7.14 Heat Stress

Working in anti-contamination clothing and/or hot weather can give rise to significant heat stress in workers, resulting in various heat-related disorders, including: fatigue, heat exhaustion, heat cramps, heat rash, and heat stroke.

The following controls SHALL be implemented to reduce risks associated with *heat stress hazards:*

a) The ES&H Team IH SHALL evaluate heat stress conditions on a case-by-case basis and establish controls in accordance with ACGIH Heat Stress Threshold Limit Values (TLVs).

b) Provisions SHALL be made by the Project RI to provide employees with shade, water, body cooling apparel, adequate breaks, and break areas. Electrolyte replenishment SHALL be done only with guidance from the HSD.

7.15 Electrical

Work with electrical devices can result in accidental contact with electrical components resulting in an electrical shock. Buildings undergoing D&D SHALL be approached as having unknown and/or undocumented sources of electrical power.

Partial electrical shutdowns and deactivations are NOT allowed without prior permission from the Project AI and concurrence of the ES&H Team Leader or designee. Where allowed, an electrical deactivation plan to include circuit Lockout & Tagout (LOTO) and color code changes SHALL be required.

The following controls SHALL be implemented to reduce risks associated with electrical hazards:

a) The electrical infrastructure including ALL subsystems and components SHALL be color coded "RED" at the beginning of the project until isolated, air gapped, and released per Section 6.10.

b) D&D projects, using a graded approach, SHALL prepare electrical deactivation plans to address the direct project area(s) and the surrounding area(s) to ensure ALL sources of power traversing the project have been identified and controlled.

c) For whole building removal projects, a Deactivation Utility Map SHALL be prepared to identify ALL underground utilities adjacent, under, or tangent to the project. The map SHALL extend a minimum distance of 25 feet around the structure and SHALL be fully researched through documentation and compared against underground line location reports until ALL lines are identified.

d) Building deactivation plans SHALL identify underground vaults, transformers feeds and utility manholes in the area.

e) The Project RI SHALL ensure that High Voltage Electricians are fully apprised of project activities AND are available during planning and site walkthroughs. The input of the High Voltage Electricians SHALL be included in the Electrical Deactivation Plan.

f) D&D activities involving electrical hazards SHALL have an electrician assigned in a lead role. Responsibilities for electrical safety associated with the project SHALL be clearly assigned. Electrical activities must comply with LLNL ES&H Manual requirements, the NEC, and Site Specific requirements.

g) Working on energized electrical systems is NOT ALLOWED. If a demonstrated need exists, as determined by the SOP RI, the ES&H manual and Maintenance and Utility Department (MUSD) procedures governing energized electrical work SHALL be followed. Additionally, the Project RI SHALL conduct a mini-pre start with the AI and D&D Leader in attendance.

h) When D&D activities are conducted in de-energized facilities, a temporary power grid SHALL be installed, as necessary, to support the project activities. Installation of the temporary power grid SHALL comply with the LLNL ES&H Manual and National Electric Code (NEC) for temporary power distribution systems. Where utilized, the grid SHALL be inspected and approved by a certified Electrical Authority Having Jurisdiction (AHJ) representative and be maintained by an assigned electrician. When a modification to the power grid is required, use of the system must stop until a certified Electrical AHJ has approved ALL modifications.

i) The Project Electrician SHALL remove ALL wires from each conduit prior to the conduits being removed. ALL conductors, electrical devices, transformers and capacitors

SHALL be tested for voltage/amps (both AC and DC) prior to any work being performed on them. ALL capacitors SHALL be discharged and grounded/bonded to prevent recharging of the capacitors by following the D&D capacitor discharge procedure. Unless prior approval is obtained from the Project AI, conduits SHALL NOT be cut or removed until empty of ALL wire or conductors.

j) Where practical, conduit SHALL be emptied of conductors. If the RI deems it impractical to remove all conductors, a request for variance shall be submitted to the AI for approval. An exception to this is for trailer facilities which generally are constructed using cable that is affixed directly to the structure within interstitial spaces. The requirement to remove all conductors in trailers is impractical and therefore not required.

k) ALL hand held power tools SHALL be double insulated or equipped with grounding pins. ALL portable power equipment SHALL be plugged into ground fault circuit interrupters (GFCI) protected connections (120 VAC). GFCI SHALL be used when electrical devices are used out-of-doors or in wet environments.

l) Power cords, extension cords, etc. SHALL be inspected at the start of each workday to ensure safe condition.

m) ALL electrical equipment used on D&D projects SHALL be listed by a Nationally Recognized Testing Laboratory OR SHALL be inspected by a representative of the LLNL AHJ.

n) Removal of light bulbs and ballasts can occur prior to issuance of the deactivation plans following lock out/tag out procedures and an authorized work document.

7.16 Mechanical

Work with mechanical utilities and devices can result in an inadvertent disruption to fire protection systems, and/or an accidental release of natural gas, sewage, cooling water, or compressed air, etc. Buildings undergoing D&D SHALL be approached as having unknown and/or undocumented sources of mechanical utility supplies and cross connections to other facilities.

Partial mechanical shutdowns and deactivations are NOT allowed without prior permission from the Project AI and concurrence of the ES&H Team Leader. Where allowed, a Mechanical Deactivation Plan to include system LOTO and color code changes SHALL be required.

The following controls SHALL be implemented to reduce risks associated with mechanical hazards:

a) The mechanical infrastructure including ALL subsystems and components SHALL be color coded "red" at the beginning of the project until released per Section 6.10.

b) D&D projects, using a graded approach, SHALL prepare mechanical deactivation plans to address the direct project area(s) and the surrounding area(s) to ensure all mechanical systems traversing the project have been identified and controlled.

c) For whole building removal projects, a Deactivation Utility Map SHALL be prepared to identify ALL underground utilities adjacent, under, or tangent to the project. The map

SHALL extend a minimum distance of 25 feet around the structure and SHALL be fully researched through documentation and compared against underground line location reports until ALL lines are identified.

d) Building deactivation plans SHALL identify underground vaults and utility manholes in the affected area.

e) The Project RI SHALL ensure that mechanical utility and communication coordinators are fully apprised of project activities and are available during planning and site walkthroughs, and that their input is included in the mechanical deactivation plan.

7.17 Heavy Equipment

During D&D activities, heavy equipment SHALL be utilized to remove salvageable equipment (including cranes and rigging, SSCs, and other materials from the work area. This work may require staging of materials and movement of heavy equipment outside of the fenced work area. These placements SHALL be limited to temporary activities and must be evaluated to minimize impact to the neighborhood. Associated hazards included in this portion of the operation include exposure of industrial hazards to non-project members.

A Rigging Expert SHALL be part of the integrated project team from planning through execution if rigging equipment is anticipated to be used on a project.

The following controls SHALL be implemented to reduce risks associated with heavy equipment hazards:

a) ALL mobile cranes/boom trucks SHALL have a copy of their certificate of inspection available for review by the ES&H Team Industrial Safety Engineer.

b) Only qualified operators SHALL perform operations using heavy equipment. Note: Operators in training may operate heavy equipment only if a qualified heavy equipment operator grants approval and oversees the entire operation.

c) The rated lift capacity of the equipment SHALL not be exceeded.

d) The ES&H Team Industrial Safety personnel SHALL work with the Project RI to survey the work site to ensure that any heavy equipment in use on the site does not pose a threat to underground or overhead utilities. Appropriate distances from overhead utilities SHALL be maintained (i.e., 20 feet minimum clearance from unshielded power lines; and 10 feet minimum clearance from shielded power lines).

e) Any temporary mobile crane/boom truck staging areas SHALL be barricaded and posted to make it very clear to passersby that it is a work zone and unauthorized access is not permitted. The crane/boom truck work zone SHALL be delineated such that the actual working radius of the crane/boom truck is within the confines of the zone. The crane SHALL be evaluated to ensure that the fully extended boom does not present a hazard to surrounding facilities if it were to collapse. When heavy equipment is utilized outside of the fenced work area, the expanded work area SHALL be barricaded, to prevent passerby's contact with the working range of the equipment. The equipment operator and/or Project RI will ensure that the appropriate barricades and postings are in place.

f) The ES&H Team Industrial Safety Engineer and Fire Department SHALL review and approve ALL temporary mobile crane/boom truck work zones outside of the already established D&D Project work zone.

g) A mobile crane/boom truck SHALL not suspend a load over any personnel or occupied facilities.

h) No lifts SHALL be made with wind speeds at or above 25 miles per hour.

i) If rigging equipment will operate next to a restricted area (e.g. super block), the RI SHALL prior contact the Program Security Representative to incorporate safeguards and security requirements into project activities.

7.18 Traffic

The D&D Project may affect traffic patterns due to project fence lines and transport of salvage and/or waste materials from the project area.

The following controls SHALL be implemented to reduce risks associated with traffic hazards:

a) Appropriate traffic signage SHALL be placed.

b) Temporary barricades SHALL be installed as appropriate. These barricades SHALL be posted with "WORKERS AND EQUIPMENT WORKING" or similar signs to inform pedestrians that this area is no longer suitable for routine walkthroughs.

c) Appropriate traffic controls SHALL be used to prevent unauthorized traffic.

d) Flaggers SHALL be used to ensure safe movement of equipment/vehicles into and out of project work sites.

e) The Project RI SHALL ensure that the appropriate barricades and postings as listed above are in place prior to project activities.

7.19 Fire Safety and Fire Department Access

Two concerns with D&D Projects are maintenance of Fire Department access and means of egress. Temporary work zones and area blockages SHALL be considerate of Fire Department access to ensure timely emergency response. Additionally, maintenance of a continuous and unobstructed way of exit travel from any point in both the project work zone and surrounding facility areas is essential. This will allow for adequate escape routes for personnel in the event of an emergency situation. An additional concern is accidental breakage of sprinkler lines during decontamination.

The following controls SHALL be implemented to reduce risks associated with fire safety hazards:

a) In the event of an emergency in the D&D Project area, the Fire Department SHALL be called at extension **911** (or **925-447-6880** if calling from a cellular phone). The Fire Department SHALL provide instructions to project workers and other affected personnel as necessary.

b) The fire protection infrastructure including ALL subsystems and components SHALL be color coded "RED" at the beginning of the project until released by the Project RI and FPE.

c) Unless pre-approved by the Project RI, Fire Protection Engineer (FPE), and LLNL Fire Department, fire sprinkler and emergency evacuation systems SHALL remain operational until the day before the structure is demolished. These systems SHALL be clearly identified prior to the removal of utilities in the facility. Any activity that can affect the operation of these systems (e.g., ceiling tile removal), SHALL be approved by the Project RI and the ES&H Team FPE prior to the initiation of work activities.

d) The means of egress SHALL be kept clear and personnel SHALL be informed how to exit the building from any work location within the building. Exit doors that have been locked from the exterior SHALL remain operable from the inside of the building. In an emergency, D&D personnel SHALL meet at their designated assembly point and account for their staff. The Project RI SHALL inform the Fire Department Incident Commander of the status of D&D personnel. If anyone is missing, the Project RI SHALL provide a probable location for that individual.

e) The Project RI SHALL submit a map, denoting the location of temporary fences and gates, to the Fire Chief (or designee) for approval. Once approved and signed, the map may be utilized to establish the temporary fences and gates.

f) Project gates SHALL remain operable by the Fire Department and located to make it easy for the Fire Department to provide emergency service to the building and occupants.

g) All changes to fire lanes and Fire Department access in and around the work area SHALL be jointly reviewed by the Project RI and ES&H FPE and submitted to the Fire Department Duty Chief for approval.

h) The Project RI SHALL contact the Fire Department to schedule all fire alarm and fire extinguishing systems terminations.

i) When performing work that exposes workers to pyrophoric or flammable materials, fire retardant clothing SHALL be worn, and flame resistant materials (e.g., fire retardant plastics and herculite) SHALL be used.

j) The accumulation of trash and combustible material SHALL be removed from the building on a daily basis. Trash dumpsters SHALL be kept at least 10 feet from any building and be emptied when full. At least two pressurized water or other appropriate type fire extinguishers SHALL be available in the demolition area of the building.

k) The Project RI shall review Fire Permits before use to ensure that the controls are clearly defined and understood by the users.

Note: A structure is considered demolished when the roof and ALL walls have been removed. The foundation may still be present.

l) Once demolition of a structure is complete, the Project RI SHALL notify the Fire Department, via email, informing them of the completed demolition.

7.20 Soil, Asphalt and Concrete Penetration

Whenever penetrating soil, asphalt or concrete there is the potential for inadvertent contact with significant hazards (e.g., live electrical conductors, process contaminated pipes, natural gas lines, water lines, and air lines). Such inadvertent contact presents the potential for injury or death to personnel, the disruption of essential services, harm to the environment, and damage to real property.

When asphalt or concrete is disturbed in a manner that creates dust particles there is a respiratory hazard caused by the silica contained in the material. The following controls SHALL be implemented to reduce risks associated with soil, asphalt and concrete structure penetrations:

Respiratory protection SHALL be utilized whenever the method for penetration of concrete or asphalt could result in airborne dust particles.

When performing work activities involving **excavation/penetration in soil, asphalt, or concrete where utilities may be located**, Plant Engineering Maintenance Operations Procedure (MOP) No. MOP-02003, *Soil Excavation (Digging, Grading, Tunneling, Trenching, and/or Drilling) Permit Procedure* SHALL be utilized. The Project RI SHALL review the permit with ALL project team members assigned to the activity prior to project start-up AND ensure the permit(s) are posted and visible at each work site.

- When performing work activities involving **penetration action in concrete floors, slabs, walls and/or ceilings greater than 3 inches in depth in buildings or areas where utilities may be located**, Plant Engineering Maintenance Operations Procedure (MOP) No. MOP-03001, *Concrete Structure (Floor, Wall, and Ceiling) Penetrations Permit Procedure*, SHALL be utilized. The Project RI SHALL review the permit with ALL project team members assigned to the activity prior to project start-up AND ensure the permit(s) are posted and visible at each work site.
- The Project RI SHALL ensure facilities undergoing D&D are scanned prior to initiating any penetration action in concrete floors, slabs, walls, and/or ceilings less than 3 inches in depth in buildings or areas where utilities may be located. The workers SHALL ensure that the proposed work area is investigated for the presence of embedded utilities prior to starting their assigned penetration work. This assurance is evident in the form of utility markings in the area to be disturbed and a valid penetration permit.
- Before buildings are peeled, tile removed, etc. Line Location SHALL be employed and completed. The marked Locator Lines SHALL be maintained as the building is peeled to ensure ALL buried utility line locations are clearly known throughout the D&D process. In the event the Line is removed, the Line must be remarked until the hazard is abated.
- Areas outside of the structure to be surveyed are to be outlined with white paint.
- Prior to excavation work, the Project RI SHALL ensure ALL Soil Excavation Permits (MOP-02003) are reviewed for adequacy by themselves, the ES&H Team ISE and the Permits Coordinator. Prior to employee entry into any excavation area, the ISE SHALL evaluate the excavation for stability, depth, odors, water and other conditions that may require corrective action. Any excavation that is 5 feet deep or greater requires shoring, or protective systems in any type of soil, except solid rock. Shoring, or protective

systems may be required at depths less than 5 feet, as conditions warrant prior to excavation activities.

- ALL excavations, regardless of depth SHALL be inspected daily by an OSHA Competent Person prior to the first entry and after any substantial occurrence (i.e., rain storm). In addition, any excavation 5 feet in depth or greater requires atmospheric testing prior to first entry. Atmospheric testing may also be required at depths less than 5 feet if the activities in the excavation warrant.
- Excavations 6 feet deep or more SHALL be barricaded a distance of 6 feet back from the excavation edge and access restricted to necessary personnel ONLY. Material, equipment, soil and machinery SHALL be kept a minimum of 2 feet back from the edge of any excavation, regardless of depth. Personnel, unless entering, or leaving the excavation site SHALL also remain 2 feet back from the edge. Where employees or equipment are allowed to cross over excavations that are 6 feet deep or more, walkways or bridges SHALL be provided and equipped with standard guardrails. ALL excavations and work in excavations SHALL be under the supervision of an OSHA Competent Person.

7.21 Explosives Contamination

Facilities used for explosive operations to include testing, chemical analysis, synthesis, or other explosive processes may contain explosives residue. This residue, if present, must be identified and removed prior to demolition of the facility.

An Explosives Safety engineer SHALL be part of the integrated project team from planning through execution if the facility has a history of explosives operations.

The following controls SHALL be implemented to reduce risks associated with explosives contamination hazards:

ALL subsystems and components potentially contaminated with explosive materials SHALL be color-coded "RED" at the beginning of the project until ALL issues of concern are resolved to the satisfaction of an ES&H Explosives SME.

The ES&H Team SHALL contact the Explosives Safety Engineer to evaluate facilities used for explosive operations prior to D&D start-up. Any suspected contamination SHALL be either removed or identified for special consideration during the demolition process.

If, during the course of dismantling a facility, material is found that anyone suspects may possibly be an energetic material, immediately STOP work and notify the RI who should contact an Explosives Safety Engineer. The Explosives Safety Engineer SHALL inspect the suspect material and, as necessary, request a chemical analysis to determine if the material is energetic. After the nature of the material is determined, the appropriate steps SHALL be taken to allow the project to continue.

7.22 Sewage

The primary hazard involved in working on sewage pipes and related components is exposure to raw sewage. The potential for exposure to disease is the primary health risk. The potential consequences, if workers are exposed, ranges from very short periods of discomfort to long-term illness.

Other hazards involve exposure of the general population to disease as a result of cross-contamination of contaminated tools and equipment utilized when working on the potable water systems. If pumps, hoses, or other equipment are not properly labeled or cleaned, and are utilized on potable water systems, the general Laboratory population could be exposed to disease.

The following controls SHALL be implemented to reduce risks associated with raw sewage hazards:

a) Personnel working where raw sewage is present SHALL be free of open wounds.

b) Individuals entering sanitary sewers, septic systems, or manholes; modifying sanitary sewers or repairing sanitary sewer systems SHALL wear the appropriate protective clothing as determined by the ES&H Team IH.

c) Protective equipment SHALL include:

- Steel-toed safety shoes.
- Latex-free surgeon's gloves.
- Laboratory issue work coveralls (or equivalent garment).
- Safety glasses with side shields.
- Skin protection (e.g. mid-calf rubber boots, mid-forearm rubber gloves, full-length coveralls).
- Poly-Tyvek coveralls when the potential for contact with raw sewage exists.
- Face shield when the potential for splash-back exists.

d) Personnel SHALL wash their hands with soap and warm water immediately after completion of any work involving raw sewage. Hand to mouth contact SHALL be avoided until hand washing is completed.

e) Poly-Tyvek coveralls SHALL be disposed of as non-hazardous municipal waste unless radioactive or hazardous materials are encountered. In this instance, the ES&H EA SHALL determine appropriate disposal. Boots, gloves and respirators SHALL be cleaned with disinfectant. All wash water for sanitizing equipment SHALL be discharged to the sanitary sewer system.

f) When work is completed, ALL equipment and hand tools used SHALL be completely sanitized by use of domestic water and a commercial disinfectant. Rinseate generated for disinfecting equipment SHALL be collected for proper characterization and disposal.

g) In the event of a spill of sewage, the ES&H EA or Environmental Duty Officer, during off hours, SHALL be contacted to provide guidance on clean up requirements.

h) To prevent cross contamination between the sanitary sewer system and the potable water system, ALL tools, hoses, pumps, and equipment utilized for work on the sanitary sewer system SHALL be sanitized after use. In addition, they SHALL be labeled "Used for Sanitary Sewage Work" and stored in a separate location from similar equipment utilized for potable water system work. Air gaps are the only allowable backflow prevention devices for sanitary sewer systems and SHALL be used when potable water systems are connected in any way to sanitary sewer components.

i) Information and controls found in IWS 11950: Working with Raw Sewage is to be followed for Site 300 work activities.

7.23 Perchlorates

Laboratory ventilation systems and/or piping may be contaminated with perchlorates. Perchlorate residues are shock sensitive, and could explode or initiate a fire if subjected to mechanical shock, excessive heat, electrical discharge or other initiating event during systems disassembly. Non-sparking tools shall be used when perchlorates are potentially present. Perchlorate residues are strongly reactive with organic materials, therefore requiring the use of inorganic tools and equipment for disassembly.

In the event that the controls set forth in this SOP and other required safety documents are not properly implemented, a worst case propagating explosion could potentially release significant amounts of energy, and could severely injure or kill workers in the immediate vicinity.

Perchlorates possess varying, but in general, fairly low toxicity. Skin or eye exposure may cause irritation. Inhalation of high concentrations may cause upper respiratory irritation, metallic taste, digestive disorders, chest pain, or difficulty breathing. Ingestion of perchlorates may cause acute effects such as metallic taste, vomiting, digestive disorders, headache, bluish skin color, kidney damage, paralysis, convulsions, and/or coma.

Perchloric D&D work requires the use of intensive PPE, which may include ballistic body armor, helmets, and face shields. The use of this PPE introduces additional industrial hazards to workers due to narrow fields of vision and heat loading associated with wearing heavy protective clothing.

There are two methods used by D&D to detect the presence of perchlorates: Methlyne Blue and Selective Ion Testing.

Methlyne blue testing is used as an initial characterization for the potential presence of perchlorates. The results of the methlyne blue test can result in a false positive; therefore, the selective ion testing method is used (based on the IH's recommendation) to confirm the results of the methlyne blue test.

Two different levels of perchloric tasks may be encountered during D&D work.

- **Level One:** Known Perchlorates exist within the equipment to be removed. The term "Known" is defined as positive results via ion specific electrode testing or visual perchlorates (salt crystals) are observed.
- **Level Two:** Potential Perchlorates exist from operations history but testing (methlyne blue or ion specific electrode) and visual inspection results prove to be negative. The probability of existing perchlorates is low.

The job specific HAC document will identify the level of the perchloric job as well as the level of PPE required as approved by the ES&H Management Team and the SOP RI.

A tailored SOP shall be developed for a Level 1 or Level 2 perchloric job as well as approved by the ES&H Management Team and the Project RI.

7.23.1 Level One Perchlorate Controls

The following controls will reduce the risk of perchlorate residue hazards for a Level One task:

a) A dismantlement plan is required for each perchloric D&D project. The plan will include a drawing showing the entire mechanical system, inlet to exhaust, and will be used as the basis for determining cut and separation locations, start and end points, and mist injection locations. The plan must be reviewed and approved by the ES&H Management Team and the Project RI.

b) All Level One perchloric D&D projects shall establish two specific access areas for each project:

   1) **Regulated Area:** The regulated area establishes a boundary to keep non-project personnel away from the immediate work area, and is established on risk, quantity, distance, and local field conditions. A decontamination work area will be established within the regulated work area. This area is where water immersion is to be utilized for cleaning perchlorate contaminated ductwork and equipment. Boundaries to the Regulated Area will be established using ropes, tapes and signs.

   2) **Restricted Area:** The restricted area is the immediate location where the work is performed and will include adequate space for initial wash down, tools/ supply staging, and component lay down. The Restricted Work Area shall not be cordoned off due to the potential for the introduction of additional tripping hazards.

c) Under no conditions can tools or equipment be brought into the Regulated Area without prior review and approval of the project IH or RI. Duct dismantlement should be conducted using hand or battery-powered saws. Tools used for maintenance disassembly shall be inorganic, preferably bronze tools. All tools used in the project shall be reviewed prior to beginning work to ensure inorganic materials are utilized.

d) Unauthorized personnel will not be allowed in the Regulated or Restricted work area during operations. If unauthorized persons enter these areas during operations, work will be stopped until unauthorized personnel depart.

e) Only employees wearing ballistic gear and directly involved with the disassembly will be allowed within 75 feet of the contaminated equipment during the disassembly phase. One or more support persons (e.g., H&S Technician) are allowed within the 75-foot radius, wearing the lightweight flak vests, hardhat, regular face shield and foam plug hearing protection inserts. These support personnel may not approach within 75 feet of the ducting when decontamination or removal work is ongoing.

f) D&D team members working in the Regulated Area shall, as a minimum, wear lightweight body armor, slip resistant safety shoes, hard hat/ballistic helmet, face shield and foam plug hearing protection inserts. Team members working in the Restricted Area shall, as a minimum, wear ballistic-rated flack vests, ballistic rated helmets with face shields, slip resistant safety shoes, PVC coated Tyvek (or equivalent) coveralls and mid-weight natural rubber, nitrile, or neoprene gloves.

g) A pre-job walk through involving the Project RI, D&D workers and appropriate ES&H Team members of the project area is a base requirement for perchloric projects. A full dress rehearsal mock up and dry run will be required prior to the start of an activity.

h) Water will be used to dissolve perchlorate salts. Attention must be given to determine if low points in the system are at risk of breaking due to the added weight of water. The work area must be contained to collect rinse water to minimize cross contamination, slip hazards, and water leaks.

i) As systems are disassembled, team members shall continually view the interior of the system, inspecting for crystallized salts or other debris. As pieces are removed, they will be sprayed with water to keep the interior moist, sealed in plastic bags, and set aside for later transport to the decontamination work area for the last phase of the decontamination project.

7.23.2 Level Two Perchlorate Controls

The following controls will reduce the risk of perchlorate residue hazards for a Level Two task:

a. A dismantlement plan is required for each perchloric D&D project. The plan will include a drawing showing the entire mechanical system, inlet to exhaust, and will be used as the basis for determining cut and separation locations, start and end points, and mist injection locations. The plan must be reviewed and approved by the ES&H Management Team and the Project RI.

b. A pre-job walk through involving the Project RI, D&D Team workers and appropriate ES&H Team members of the project area is a base requirement for perchloric projects. On a graded approach, a full dress rehearsal mock up and dry run may also be required prior to the start of an activity.

c. Water flushing will be used to dissolve potential perchlorate salts in inaccessible areas as a precaution if methlyne blue screening is negative on accessible areas. Attention must be given to determine if low points in the system are at risk of breaking due to the added weight of water. The work area must be contained to collect rinse water to minimize cross contamination, slip hazards, and water leaks.

d. Methlyne blue screening and visual inspections must take place as the system is being dismantled specifically in areas that were not accessible during initial screening. If positive methlyne blue results are observed (Purple in color) or visual crystals are identified, STOP work, cordon off and post the immediate area then contact the RI for further assessments.

7.24 Stored Energy

During D&D activities, identifying and controlling ALL sources of energy (e.g. utilities, equipment) is required. Natural gas, high pressure gasses and liquids, sewage, waste lines and electricity are examples of systems that may present stored energy hazards. Additional examples include, any elevated mass that can drop and springs that can suddenly release tension.

The following controls SHALL be implemented to reduce the risk of stored energy hazards:

a) ALL potential stored energy subsystems and components SHALL be identified and color coded "RED" at the beginning of the project until issues of concern are addressed and resolved to the satisfaction of the appropriate ES&H Team Disciplines.

b) Controls found in the ES&H Manual, Document 12.6, *LLNL Lockout/Tagout Program*, Section 1.4, *Administrative Locking and Tagging,* AND Section 1.4.1, *Deactivation and Mothballing,* SHALL be applied to ALL D&D projects.

8.0 ENVIRONMENTAL REGULATORY IMPACTS, NOTIFICATIONS, PERMITS AND CONTROLS

Many environmental impacts require that notifications be made to various responsible environmental regulatory agencies, including but not limited to the Environmental Protection Agency (EPA) and the DOE. Therefore, ALL D&D activities SHALL be evaluated for environmental impacts and potential impacts, prior to project commencement and as early in the planning process as possible. The ES&H Team EA SHALL act as the D&D Environmental single point-of-contact (POC) coordinating environmental concerns with the LLNL Environmental Protection Department (EPD), DOE and other regulatory agencies; as appropriate.

The EA SHALL evaluate project activities for required documents and permits [i.e. National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and Air Quality Notifications. In this capacity the EA is responsible for preparing the documents, ensuring that they are reviewed, approved, and obtained (with copies to the Project RI) prior to commencing project activities. It is important that the EA be kept apprised of project schedules to guarantee ALL necessary documents and permits are submitted and obtained in a timely manner. Therefore the EA SHALL attend weekly project review meetings.

8.1 Sampling Plans

D&D activities require stringent controls to identify, characterize, and sample for hazardous constituents and components. The ES&H Team EA, working closely with the other ES&H Team

Disciplines, SHALL take the lead in preparing Sampling Plans for D&D projects. An example of a one-page sampling plan is included as Attachment G.

a) Sampling Plans SHALL specify type of sample, location, basis for, quantity, analytical procedure(s) required, laboratory turn around times, estimated sampler field time, and cost of samples necessary to adequately and efficiently characterize the SSCs for both worker safety and final waste disposition.

b) When sampling involves characterization of potentially Low Level Radioactive Waste, the ES&H Team EA SHALL submit the Plan for written concurrence to the Radiological Characterization Analyst (RCA) and the Waste Management Liaison that supports D&D. The intent of this concurrence is to ensure that the sampling plan adequately supports the disposal requirements set forth by the waste disposal site chosen for the project.

c) The EA SHALL submit the final, signed Sampling Plan to the Project RI for approval before any sampling is conducted. The Project RI is responsible for ensuring that the sampling plan addresses the entire scope of the project, is consistent with the waste disposal plan (e.g., waste disposal site, waste container types, and waste configuration.), and that there is sufficient budget and schedule in the project baseline for the sampling effort.

d) The Project RI and ES&H Team EA SHALL review the Sampling Plan with the assigned H&S Technician and RHWM technician (s) to ensure it is understood and, for worker safety and environmental protection, proper PPE, for the sampling evolution, is documented.

e) IF changes in project scope and/or activities occur that require Sampling Plan modification, THEN the Change Control SHALL be identified and managed by the ES&H Team EA, Project RI, and other ES&H Team Disciplines, as identified.

8.2 RCRA and/or CERCLA Permitted Facilities

For the D&D of Resource Conservation Recovery Act (RCRA) and/or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) permitted facilities, the EA SHALL consult with EPD/Permits and Regulatory Affairs Group (PRAG) to determine RCRA/CERCLA Corrective Action issues, if any. IF Corrective Action issues exist, then EPD/PRAG SHALL act as the Point of Contact (POC) for interactions with The Department of Toxic Substances Control (DTSC) and other regulatory agencies. The PRAG Analyst SHALL be involved with RCRA/CERCLA projects from the beginning planning stages and interact with the Project RI to coordinate and approve Sampling Plans in accordance with RCRA/CERCLA requirements.

8.3 Demolition and Renovation Environmental Controls

The following sections describe the various environmental protection controls that SHALL be followed at a minimum on D&D projects where appropriate. These controls are to be used in conjunction with the ES&H controls discussed in the previous sections.

8.3.1 Demolition Notification

Operations' involving building or structural component demolition requires the notification of the Bay Area Air Quality Management District (BAAQMD) or San Joaquin Valley Unified Air Pollution Control district (SJVUAPCD), as appropriate. Notification SHALL be made at least ten (10) days prior to the commencement of demolition activities.

Three to four weeks prior to commencing structural demolition activities, the ES&H Team EA SHALL coordinate with the Permits and Regulatory Affairs Division (PRAD) Air Analyst to ensure that the submittal of a 10-working-day demolition notification is submitted in support of the project schedule.

The EA shall work closely with the Project RI to monitor the scheduled start and completion dates for the demolition activities and shall ensure that the proper notifications are made if the schedule changes once the notification has been submitted.

The Project RI SHALL not proceed with demolition until a copy of the demolition permit is received from the EA.

Exemption: Notification is not required for the demolition of mobile structures.

Ensure nuisance dust must be kept to a minimum during demolition. Nuisance dust complaints can lead to a Notice of Violation (NOV) from an Air Board.

8.3.2 Asbestos Containing Material Abatement Notification and Controls

Where the amount of Regulatory Asbestos Containing Material (RACM) exceeds BAAQMD and/or SJVUAPCD limits, permits and prior notifications are required and the following controls SHALL be followed:

a) Three to four weeks prior to commencing RACM abatement activities, the ES&H Team EA SHALL coordinate with the PRAD Air Analyst the submittal of a 10-working-day asbestos abatement notification.

- The Asbestos RI SHALL report to the ES&H Team EA the quantity (i.e., square feet or cubic feet), and concentration of asbestos scheduled to be removed during the demolition activity.
- IF abatement activities are performed by LLNL employees, THEN the ES&H Team EA SHALL coordinate with the PRAD Air Analyst to ensure all required paperwork is generated and proper notification(s) are made.
- IF a subcontractor is performing the abatement activities, THEN the ES&H Team EA SHALL coordinate with the assigned subcontractor to ensure paperwork is completed and proper notifications(s) are made. The subcontractor is responsible for submitting the 10-day notification to the appropriate agency.

b) The Project RI SHALL ensure that the required permit is in place and that work starts on the specified date.

c) The EA shall work closely with the Project RI to monitor the scheduled start and completion dates for the ACM Abatement activities and shall ensure that the proper notifications are made if the schedule changes once the notification has been submitted.

d) All friable or non-friable ACM deemed waste that is, or has the potential to become friable SHALL be managed as hazardous waste.

e) ALL ACM SHALL be wetted prior to packaging to prevent dispersion and facilitate handling.

f) ACM SHALL be packaged inside two layers of plastic bags (6-mil thickness each). During packaging activities, ensure the inside bag is properly sealed prior to placement in the outside bag. When packaging is complete, ensure the outside bag is sealed in such a manner as to secure its contents.

8.3.3 Abrasive Blasting

Abrasive blasting of previously painted or metal surfaces may potentially contaminate the environment and expose workers to hazardous effluent.

a) Abrasive blasting and surface preparation must be accomplished with California Air Resources Board-approved grit.

b) The effluent from abrasive blasting SHALL be evaluated by the ES&H Team EA for proper disposal.

c) No abrasive blasting effluent SHALL be discharged to the storm drain.

d) Materials SHALL be managed to prevent discharge to the ground and/or storm drainage system. IF a discharge occurs, the materials SHALL be cleaned up immediately upon completion of the operation, OR if during the rainy season, by the end of each work day.

e) Respiratory protection SHALL be worn when abrasive blasting until written justification for not wearing it is provided by the ES&H IH.

8.3.4 Surface and Ground

To prevent the discharge of hazardous, radioactive, or mixed materials or wastes to the environment, D&D activities having the potential for inadvertent release of secondary waste to the environment (e.g., air, soil, asphalt, surface, or ground water), SHALL be controlled via work locations and the following controls:

a) The Project RI shall ensure that all routes of entry to the environment, including direct discharges to air, soil, surface water, storm sewer, sanitary sewer, wells, and drainage channels are protected.

b) Tools, equipment, and materials utilized for D&D activities SHALL be properly stored by the equipment user to prevent secondary cross-contamination to the environment.

c) Construction equipment and vehicles SHALL be inspected daily by the equipment operators for leaks of fuel, engine coolant, oil, and hydraulic fluid. Any leaks SHALL be

contained, repaired, and reported immediately to the Project RI. The Project RI SHALL notify the ES&H Team EA for cleanup guidance of discharges to the environment.

d) Waste generated from hazardous materials used by the contractor, or its sub-contractors, are the responsibility of the contractor and SHALL be handled in accordance with applicable Federal, State, and local environmental regulations. These wastes may include, but are not limited to: batteries, paints, solvents, oil, and greases as well as empty containers. Temporary storage of waste on site must follow LLNL's policies (including implementing the Storm Water Pollution Prevention Plan Best Management Practices (SWPPP BMPs).

8.4 Disposal of Materials

Construction products with recycled content SHALL be used whenever possible. However, performance standards, feasibility, and cost effectiveness SHALL be evaluated prior to use. For demolition projects, the Project RI SHALL coordinate with the ES&H Team EA and DUS representative to ensure the recycling of as much demolition debris as possible.

Periodically, as needed, and at the conclusion of the job, all solid waste materials SHALL be removed and properly disposed of in accordance with LLNL waste disposal procedures. Contact the ES&H Team EA for disposal requirements. Refer to Attachment F for information and material release protocols that are followed on D&D projects.

8.4.1 Waste Generation

D&D activities pose the possibility of generating large amounts of hazardous, non-hazardous, radioactive, and non-hazardous controlled wastes. All efforts will be pursued to avoid the creation of mixed wastes, or the creation of a secondary controlled waste streams. Pollution prevention and waste minimization opportunities SHALL be sought and incorporated into all D&D project activities.

a) Demolition and disposal of various equipment and debris SHALL be evaluated by the ES&H Team EA to determine hazardous and/or radioactive characteristics of equipment/materials. Evaluation will include compliance with DOE's recycling moratorium at LLNL. DOE's policy is to recycle material that meets the release level. The EA will determine the appropriate disposition.

b) Pre-construction soil, asphalt, and concrete sampling or surveying is required prior to soil excavation and asphalt/concrete removal.

c) The ES&H Team EA SHALL review sample analytical data and/or due diligence documentation and provide the Project RI with documentation regarding the management of excess soil, asphalt, and concrete generated during the project.

d) Waste storage practices SHALL include implementing BMPs identified in the SWPPP to prevent contact with storm water runoff.

e) Waste that is below 10CFR 835 releasable but above background SHALL be disposed of by LLNL.

8.4.2 Non-Hazardous Building Debris

During D&D activities, non-hazardous building debris SHALL be sorted and segregated for disposal. The D&D team and its subcontractors SHALL separate excess materials (i.e., concrete, soil, asphalt, and piping) as follows:

a) Non-hazardous debris SHALL NOT be released without prior written approval of the ES&H Team EA.

b) Excess soil, concrete and/or rubble to be disposed or reused offsite may be released only to an approved Class I, Class II or Class III landfill as directed by the ES&H EA. No soil, concrete or rubble may be released to a non-approved facility such as an unclassified landfill (i.e., CalMat, Pleasanton).

c) Non-hazardous or recycled materials SHALL NOT be transported to final disposition unless properly released.

d) Materials removed from the project site for temporary storage SHALL be properly identified.

e) Soil piles staged for future disposal must be clearly identified and protected to avoid contaminating the environment. At Site 300, soil piles must be staged following procedures established for the clean soil storage area.

f) Storage practices must include implementing BMPs identified in the SWPPP to prevent contact with storm water runoff.

8.4.3 Wastewater Discharges

All water and wastewater discharges SHALL be in compliance with LLNL's permits as applicable including National Pollutant Discharge Elimination System (NPDES) permit and Waste Discharge Approval Requirements (WDARs) and the Livermore Water Reclamation Plant (LWRP) permit. Discharges from Site 300 must have prior approval from the EPD and the City of Livermore before discharging to the Livermore site sanitary sewer.

a) The ES&H Team or Environmental Stewardship & Planning Division (ESPD) EA SHALL coordinate the evaluation of wastewater issues to determine proper disposal.

b) The Project RI SHALL work with the EA to identify and protect storm drains within the project drainage area from accidental discharge of waste from construction and demolition activities, such as sediment, paints, oils, and gasoline.

c) All wastewater containing soaps, chemicals, or other contaminants SHALL NOT be discharged to the storm drainage system or ground. These discharges SHALL be collected and discharged to the Livermore site sanitary sewer (with an approved WDAR) or disposed as non-sewerable waste.

d) Wastewater from boiler cleaning and flushing SHALL NOT be discharged to the storm drainage system or to ground.

e) Boiler cleaning effluents may be discharged to the Livermore site sanitary sewer (following characterization with an approved WDAR) or collected and managed appropriately as waste.

f) All wastewater that is discharged to the Livermore site sanitary sewer SHALL be properly characterized to determine if the discharge is consistent with LLNL discharge standards.

g) The EA SHALL contact the appropriate personnel to update the building drain management database reflecting changes resulting from the demolition activity.

8.4.4 Concrete Wastewater Management

D&D activities include saw cutting and demolition of concrete structures, which utilize water as a cutting and cooling medium. These operations pose the potential for generating large quantities of potentially contaminated wastewater. Concrete wastewater management must follow the BMPs identified in the SWPPP for the site where work is conducted.

a) Wastewater generated from concrete mixing, concrete cutting, and equipment rinsing activities SHALL not be discharged to the sanitary sewer or to the storm drainage system. When using wet cutting techniques, vacuum up or collect slurry for proper disposal.

b) IF contamination of the concrete is not suspected, THEN saw cutting slurry may be discharged to a low spot created with the guidance of EPD. This discharge area SHALL be isolated from the storm drainage system.

c) IF contamination of the concrete is known or suspected, THEN collect or vacuum the wastewater into drums for sampling, characterization, and proper disposal. All wastewater collected SHALL be released after characterization and approval by the ES&H Team EA.

8.4.5 Waste Accumulation Areas

The Facilities Management Department manages a Consolidated Waste Accumulation Area (CWAA) where all D&D project wastes that are required to be controlled are stored. Therefore, authorization from the D&D Group Leader SHALL be obtained before establishing a temporary WAA to support any D&D project.

If a temporary WAA is established the following controls SHALL be followed:

a) The ES&H Team EA SHALL prepare and obtain approval for a WAA contingency plan. The WAA contingency plan SHALL specify appropriate responsibilities, emergency equipment, and required actions to mitigate incidents.

b) A WAA Operator SHALL be assigned by the RI. The WAA Operator is responsible for performing the day-to-day operations and activities at the WAA. The WAA operator is often the RHWM field technician, whose responsibilities include:

- Receiving waste from generator and maintenance of waste containers in WAA;

- Conducting weekly inspections;
- Maintaining required safety equipment
- Preparing waste for transportation to RHWM;
- Maintaining documentation associated with the WAA operations and activities; and
- Maintaining an inventory of waste in the WAA.

c) A WAA Coordinator SHALL be assigned by the RI. The WAA Coordinator is responsible for overseeing the operations and activities performed at the WAA. The WAA Coordinator is responsible for:

- Ensuring that required safety and spill response equipment is maintained in the WAA.
- Reporting WAA activities to management.
- Reviewing WAA inspection records, waste requisition discrepancy forms, and other documentation associated with WAA operations, as needed.
- Informing the EA, ES&H Team leader, and authorizing organization (program line management) of all releases (leaks or spills).

d) The WAA SHALL be set up and managed in accordance with policies described in Document 36.3, "Management of Satellite and Waste Accumulation Areas" of the ES&H Manual, the Hazardous Waste Generation and Certification training course (EP-0006) and the WAA Coordinator/Operator Training course (EP-0053).

e) Low Level Waste (LLW) to be disposed of at the Nevada Test Site (NTS) SHALL be evaluated and approved by an ES&H Team EA and an RHWM RCA. This waste SHALL be stored in a designated DOT approved transport container pending final disposition. There are no time limits required by law for the accumulation of radioactive waste. However, as a best management practice, LLNL often follows the 9-month accumulation time limit for the onsite storage of hazardous waste.

f) Upon completion of the project, the WAA Coordinator and Operator SHALL close the WAA with assistance from the ES&H Team EA in accordance with the WAA guidelines.

g) IF radiological airborne monitoring of stored waste is deemed necessary by the ES&H Team HP and/or EA, THEN, per the discretion of the EA, analytical results SHALL be forwarded to PRAD. PRAD personnel SHALL evaluate the emissions data to ensure D&D compliance with NESHAPs requirements.

8.5 D&D Standard Operating Procedures

D&D has six generic SOPs in place for the removal and disposition of materials as follows:

- Removal of Potentially Contaminated/Contaminated Ventilation Systems, Piping, and Associated Equipment
- Removal of Potentially Contaminated/Hazardous Above-Grade Pipe
- Removal of Potentially Contaminated/Hazardous Below-Grade Pipe

- Removal of Potentially Contaminated Box-Type HEPA Filters
- Dismantling and Removal or Maintenance of a Ventilation System Contaminated with Perchlorates
- Vacuum Pump Disposition

These SOPS are included in Attachment H for reference and should be referred to for all D&D projects.

8.6 Satellite Accumulation Area (SAA)

Hazardous and mixed wastes generated in the workplace SHALL be collected in Satellite Accumulation Areas (SAAs). These SAAs SHALL be established and managed in accordance with requirements in EP-0006 Hazardous Waste Generation and Certification Training Manual, Lessons 3 & 4 and Document 36.3, "Management of Satellite and Waste Accumulation Areas" of the ES&H Manual.

Guidance for Satellite Accumulation Areas (SAAs) are as follows:

a) Hazardous waste SHALL be accumulated in containers.

b) Hazardous waste SHALL be accumulated "at the initial point of accumulation, which is at or near the area where the waste is originally generated." The process generating the waste and the satellite accumulation point SHALL be in the same room or work area.

c) The SAA SHALL be "under the control" of the operator of the process generating the waste. The term "operator" refers to the "hands-on" operator of the machinery or activity that generates the waste and not the overall operator of the facility. The SAA is to be in the "line of sight" of the operator or in a locked compartment or area to which ONLY the operator controls access.

d) One operator SHALL retain overall responsibility and control of the SAA to ensure proper management of the waste in order to prevent incompatible mixing of wastes and to ensure waste is properly characterized and placed in the appropriate waste container.

e) The responsible operator will sign the waste disposal requisition form and is required to complete the initial Hazardous Waste Generation and Certification course (EP-0006) and attend an annual refresher course thereafter (EP-0006-R).

f) An operator may "accumulate as much as 55 gallons of hazardous waste at or near any point of generation" except as provided below:

- If not all of the waste streams generated by this process and located within the same physical area are compatible, a separate 55-gallon limit applies to each group of waste streams that are compatible.
- If the generator determines that using only one 55-gallon container (or one-quart container for extremely accumulate specific compatible waste streams is not practical (e.g., prevents recycling or requires unreasonable accumulation procedures), or is not safe from an environmental or worker/public health and safety standpoint, the

generator may apply a separate 55-gallon (or one-quart) limit to those specific compatible waste streams.

g) The accumulation containers must have a proper Hazardous Waste Label affixed to the outside of the container that is filled out with the start date of accumulation, the composition and physical state of the waste, the hazardous properties of the waste, and the name and extension of the generator.

h) The accumulation containers must be kept closed except when it is necessary to add or remove waste. The DTSC considers containers closed when the lid is tightly in place such that waste material or vapors contained within would not escape in the event the container is accidentally tipped over.

i) The waste containers must be moved out of the SAA to the WAA no later than nine months after waste is first added to the container, or when the container is full, whichever occurs first. Once the containers have reached the specified quantity (55-gallons or one-quart), the generator must move the container to the WAA within three days of the workplace end date and comply with the 90-day storage limit. The 90-day clock starts on the workplace accumulation end date. The term "day" means calendar day. Periods of time are calculated by excluding the first day and including the last. However, if the last day is a Saturday, Sunday, or holiday specified in Government Code, Section 6700, it is also excluded.

8.7 Waste Minimization and Pollution Prevention

ERD D&D is committed to implement pollution prevention and waste minimization (P2/WMin) on D&D projects in support of the institutional Environmental Management System (EMS). Therefore, P2/WMin SHALL be incorporated into ALL project plans beginning with the end state (waste disposal) in mind.

P2/WMin can reduce D&D costs by minimizing time spent by staff on the resolution of waste management issues and documentation. Practices that facilitate P2/WMin include but are not limited to the following:

a) Surgical removal of contamination to minimize waste and maximize recycle/reuse in accordance with DOE's recycling moratorium. If the material meets the release criteria established for the site, it can be recycled. If not, it will be painted with a blue color and then disposed of at a landfill by direct burial. In this case, LLNL will handle the disposal. Any material that has been painted blue will be managed under the site's RCRA profile and may not be recycled.

b) Project assessment of P2/WMin opportunities through assets-for-value contracting.

c) Design of D&D processes to allow most efficient reuse and recycling of D&D materials.

d) Proper waste segregation and spill prevention during D&D operations.

e) Development and use of Historical Operations and Hazards maps.

In addition, the Project RI SHALL work with the ES&H Team Disciplines to evaluate the project during the planning phase to establish cost effective recycling and reutilization strategies for

demolished materials. The net results of which SHALL be directed to extract the highest value from decommissioned and demolished materials and to minimize waste management costs as well as reduce D&D costs.

8.8 Storm Water Pollution Prevention

D&D activities pose the potential to negatively affect storm water quality. To minimize this potential D&D projects must implement appropriate controls as identified in LLNL policies, and state and federal regulations. LLNL implements distinct site-wide storm water pollution prevention programs at the Livermore site (Site 200) and Site 300. D&D projects that disturb one acre or more (including project site and any associated laydown areas) are required to obtain a construction storm water permit and implement a project specific construction activity SWPPP. Each project, regardless of the level of documentation required, SHALL implement these basic principles of storm water pollution prevention.

8.8.1 Project Site Perimeter Control

a) Prevent clean runoff from locations off the project site from flowing through areas disturbed by the project. This may include diverting runoff around the project site or conveying runoff through non-erosive swales or piping to a stabilized storm drain.

b) Prevent sediment-contaminated runoff from leaving the site. This may be accomplished with a variety of sediment control measures around the site perimeter and at all storm drains within the project site and/or through sediment settling basins.

c) Prevent tracking of sediment from the project site onto surrounding roads. This may be accomplished by controlling ingress and egress points through stabilized entrances and wheel washes.

8.8.2 Erosion Control

Protect inactive disturbed areas and soil piles during the project through the use of temporary vegetation, tacked or crimped straw, rolled erosion control products, or gravel.

8.8.3 Material and Waste Storage and Handling

a) Store all materials that have the potential to pollute storm water (primarily liquids and powders) in a manner that prevents contact with the rain and runoff, such as in water-tight sheds and containers, in secondary containment, inside buildings, or under secured tarps.

b) Use covered dumpsters with closed drain holes.

c) Maintain orderly storage areas.

d) Place materials on pallets.

8.8.4 Good Housekeeping

a) Clean up the jobsite at the close of each work day.

b) Return unused materials to the appropriate storage location.

c) Properly dispose of all wastes.

d) Close dumpsters when not in use and at the end of the day.

8.8.5 Inspections

Regularly inspect ALL areas of the jobsite, including the work areas, site perimeters, and laydown areas for proper implementation and adequacy of all control measures. Document all inspections.

8.8.6 Training

Provide SWPPP awareness training for all workers whose job activities may result in storm water pollution. Include general SWPPP awareness topics in the tailgate meetings. Provide specialized training for inspectors, RIs.

8.8.7 Final Stabilization

All disturbed areas must be stabilized before the project is considered complete. Stabilization may be achieved by using gravel, vegetation, asphalt or concrete, or permanent mulch. Note that vegetated areas must have a 70% uniform coverage of the surface to be considered stabilized.

9.0 TRAINING AND REQUIRED READING

Note: Individuals hard-matrixed to D&D performing technical work, are required to maintain an annual qualification card to work under this SOP.

The SOP RI is responsible for the basic training requirements for matrix employees working under the auspices of this SOP. Other job-specific training may be required and this training shall be documented in the training matrix or equivalent document. The Project RI shall ensure that all required programmatic training is complete and documented prior to requesting authorization to proceed.

10.0 EQUIPMENT MAINTENANCE AND INSPECTIONS

All tools and equipment used on D&D projects are controlled by the Tool Crib Operator. Equipment maintenance and Inspection is governed by the operating procedures for the Tool Cribs. The Project RI SHALL ensure that all tools and equipment purchased or used by the project is handled in accordance with the tool crib procedures while on the project and is properly packaged, labeled, and returned to the Tool Crib when the project is complete.

Additionally, the Project RI SHALL repair or replace any damaged equipment before the project can be closed out.

11.0 PROJECT QUALITY ASSURANCE

The Project RI SHALL ensure that formal and informal self assessments are conducted, documented, and reviewed annually. The D&D Project Self Assessments SHALL be utilized for evaluating ES&H compliance, process improvement, and to identify areas requiring procedural modifications. Lessons Learned during the performance of D&D projects SHALL be incorporated into all future projects and subsequent SOP reviews as appropriate. In addition, Project RIs SHALL schedule peer reviews to review adherence to this SOP, the project IWS(s), and Safety Plan(s) with other D&D Project Leaders and Project ES&H Technicians.

12.0 EMERGENCY RESPONSE PLANS AND PROCEDURES

In the event of an emergency, including electrical shocks, immediately DIAL **911** OR if calling from a cellular phone, dial **925-447-6880**. LLNL has dedicated x911 as the dedicated emergency number for reporting emergency information to the Lab Fire Dispatcher. In addition the following requirements shall be met:

a) Upon arriving at the site medical facility, Health Services personnel SHALL be provided with information necessary to treat individuals exposed to hazardous and/or radioactive material greater than regulatory limits.

b) D&D project personnel SHALL be familiar with the emergency evacuation routes and self-help assembly locations associated with the assigned projects.

12.1 Personnel or Area Contamination

In the event a person or area experiences uncontrolled or unplanned hazardous or radioactive contamination, (e.g., by an alarming continuous air monitor, an announcement by coworker, the spilling of radioactive material, or monitoring of the workplace):

a) Leave the room or immediate area and wait nearby (i.e., in a predetermined holding area). This shall minimize the chances of breathing airborne material.

b) Ask an uncontaminated coworker, if one is available, to call Hazards Control for assistance. This, and waiting in the vicinity, will help avoid the spread of contamination.

c) Stay in place (nearby) until monitored and released by Hazards Control personnel. Instruct others to stay out of potentially contaminated areas. Declare a "Stop Work" if needed.

d) Do not re-enter the work area until authorized to do so by the H&S Technician.

e) Notify the AI, RI, and ES&H Team Leader as soon as possible.

12.2 Standard Decontamination Procedures for Personal Clothing or Skin Contamination

If an individual suspects personal clothing or skin contamination with radioactive or non-liquid hazardous materials, the following steps shall be taken:

a) Contact the H&S Technician for assistance in determining the extent of contamination.

b) The H&S Technician shall consult the appropriate discipline to determine suitable decontamination procedures and determine if transportation to HSD is required.

c) If any decontamination is performed in the field (e.g., washing skin with mild soap and warm water), collect and retain all waste. Contact the area EA for proper characterization and disposal of waste generated.

d) Notify the supervisor, RI, AI, ES&H Team Leader, and appropriate F&I disciplines of the incident and conditions.

e) If an individual's clothing, skin or eyes may have become contaminated with a liquid hazardous material, the following steps shall be taken:

   1) Immediately remove the contaminated clothing and begin flushing skin or eyes with water for a minimum of 15 minutes.

   2) Seek medical treatment at HSD or other medical provider.

   3) If any decontamination is performed in the field (i.e., washing skin with mild soap and warm water), collect and retain all waste. Contact the area EA for proper characterization and disposal of waste generated.

13.0 ACRONYMS AND ABBREVIATIONS

ACM	Asbestos-Containing Material
ACGIH	American Conference of Governmental Industrial Hygienists
AHJ	Authority Having Jurisdiction
AL	Action Level
BAAQMD	Bay Area Air Quality Management District
BMP	Best Management Practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWAA	Consolidated Waste Accumulation Area
dBA	Decibel (A-weighted scale)
D&D	Deactivation, Decontamination, Decommissioning, and Demolition
DOE	Department of Energy
EA	Environmental Analyst
EPD	Environmental Protection Department
ES&H	Environmental, Safety, and Health
EMAD	Environmental Monitoring and Analytical Division
FPE	Fire Protection Engineer
GFCI	Ground Fault Circuit Interrupters
H&S TECH	Health & Safety Technician
HAC	Hazards Assessment and Control document
HEPA	High Efficiency Particulate Air
HP	Health Physicist
HPD	Hearing Protective Devices
HVAC	Heat, Ventilation, and Air Conditioning
IH	Industrial Hygienist
ISE	Industrial Safety Engineer
ISM	Integrated Safety Management
IWS	Integration Worksheet
LCM	Lead-Containing Materials
LLNL	Lawrence Livermore National Laboratory
LLW	Low-Level Waste
LOTO	Lockout & Tagout
MATT	Monthly Accounting Tracking Tool
MOP	Maintenance Operations Procedure

MUSD	Maintenance and Utility Department
NEC	National Electric Code
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standard for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NTS	Nevada Test Site
NOV	Notice of Violation
OSHA	Occupational Safety and Health Administration
P2/WMin	Pollution Prevention and Waste Minimization
PACM	Presumed Asbestos-Containing Materials
PM	Project Manager
POC	Point of Contact
PPE	Personal Protective Equipment
PRAD	Permits and Regulatory Affairs Division
PTHA	Pre-Task Hazards Analysis
RACM	Regulated Asbestos Containing Material
RCA	Radiological Characterization Analyst
RCRA	Resource Conservation Recovery Act
RHWM	Radioactive Hazardous Waste Management
RI	Responsible Individual
RPIE	Real Property and Installed Equipment
SAA	Satellite Accumulation Area
SJVUAPCD	San Joaquin Valley Unified Air Pollution Control District
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SSC	Structure, Sub-Systems, and Components
SSSP	Site Specific Safety Plan
SWPPP	Storm Water Pollution Prevention Plan
TLD	Thermo luminescent dosimeter
TYSP	Ten Year Site Plan
TLV	Threshold Limit Value
TWA	Time Weighted Average
WAA	Waste Accumulation Area
WAC	Waste Acceptance Criteria
WDAR	Waste Discharge Approval Requirements
WDR	Waste Disposal Requisition

Attachment A

SOP Communication Form

Attachment B

D&D Team
Communication Process Flow Diagram

Attachment C

D&D Team
OSHA Regulations, Subpart T- Demolition

Attachment D

Workforce Planning Documentation

D-1: Project Pipeline Example

D-2: Project Assignments

D-3: Resource Loading Example

Attachment E

Monthly Accounting Tracking Tool (MATT) Example

Attachment F

D&D Protocols

D&D Team Standardized Equipment & Material Release Protocols

Releasing equipment and material from offices, laboratories, transportainers, storage areas and construction or demolition sites requires coordination and concise communication between all participants.

The following criteria apply to all D&D activities involving personal property/material release:

a) Material and equipment removed from D&D project areas will be labeled/color coded.

b) Labels bearing the D&D logo with either a red, blue or green D&D logo will be used for individual items or containers of items. Red, blue or green spray paint will be used to identify large bulky items, usually originating from demolition projects.

c) Color-coded items should be segregated to maintain positive control.

d) Attaching pictures/diagrams to release documentation is encouraged but is not required for releasing equipment or items.

e) Survey and documentation requirements depend on the perceived, real or expected hazards associated with a given project. The Protocol Level will be assigned at the beginning of the project.

A color code will be utilized as follows to communicate the status or level of concern for equipment undergoing release:

Colored labels or paint should be applied to be easily visible.

When changing the color code on an item, the previous color should be completely covered by the new color, or painted over with black. Green and Blue color can be applicable only after release memorandum or e-mail is received from the EA.

The color code follows the format detailed below:

Red — A red label or paint will be used to identify items that cannot be free-released or items that are not to be moved from their project area.

Green — A green label or paint indicates the item(s) can be released unconditionally to the equipment end point destination (re-use, DUS, scrap, etc.).

Blue — A blue label or paint will be applied on materials identified as controlled disposal to the Municipal Landfill (non-recyclables)

Black — The color black is used to obscure previously applied colors and also used to write comments.

Roles, Responsibilities, and Authorities

Project Responsible Individual:

In conjunction with the ES&H disciplines, establishes project Protocol Level.
Informs all project participants of the selected Protocol Level and posts the procedure at the worksite.
In conjunction with the ES&H disciplines approves changes in Protocol Level or modifications to the specific project use of the selected Protocol.
Obtain and control official release memos.

Project Assigned D&D Health & Safety Technician:

In conjunction with the EA and HP is Responsible for releasing equipment and material from all D&D-controlled project areas.

Project Assigned D&D RHWM Technician:

Accountable for all hazardous waste manifesting, documentation, shipping

Project Assigned D&D Laborer:

Responsible for loading and transporting materials to DUS, municipal landfill, and other laboratory locations as directed by the Responsible Individual.
The Project Assigned D&D Laborer is also responsible for coordinating the Sunflower reports for non-hazardous materials.

Description of Protocols

Regardless of equipment end point destination—reuse, recycling, or disposal—the following protocols apply to all equipment and material released or transferred from D&D projects. Four different Protocol Levels have been defined:

1) Examples of Level One projects includes transportainer clean outs, ventilation system dismantlement where contamination is possible, and laboratory reconfigurations involving known contamination.
2) Level Two applies primarily to radioactive material management areas (RMMAs).
3) Examples of Level Three projects include clean out of low level radioactive material area (RMA) laboratories, rooms/lockers where only sealed radioactive sources were stored, offices adjacent to RMMAs or non-rad laboratories, and removal of uncontaminated construction debris from demolition projects.
4) Examples of Level Four projects include clean out or migrations of offices, conference rooms, or non-hazardous storerooms.

Level One Release Protocol

A Level One Release Protocol is the highest level of concern and applies to large or small projects that involve:

Known or expected hazardous and/or radioactive materials that could pose an immediate hazard to personnel;

Items/areas for which insufficient historical documentation exists; and

Jobs that require a database or inventory to keep track of the large number of items generated and sampled or surveyed.

Required surveys and documentation:

Documented radiation dose rate surveys of the object(s) or container(s), as applicable.

Documented direct surface contamination surveys (HP/IH) of the object(s) or container(s), as applicable.

Documented contamination swipe surveys (HP/IH/EA) of the object(s) or container(s), as applicable.

Inventory list or database of equipment or material where sample tracking is required.

Completed Equipment/Property Release Form for each item or list of related items, other than waste, that will be moved to new location.

Controls:

Materials and equipment shall be segregated prior to loading by color code identification.

A D&D H&S Technician (or RI-approved alternate) must verify proper color- coding on all materials removed for disposal as they are being loaded.

Where a release memo is issued specifying items or equipment to be released, and the memo specifies the item by a unique number, a copy of the memo will be used to check off each item as it is being loaded. The checked off memo will be forwarded to the EA.

Level Two Release Protocol

A Level Two Release Protocol is the second highest level of concern and applies primarily to radioactive material management areas (RMMAs), and laboratories/projects where:

There are known or expected hazardous and/or radioactive materials that could pose an immediate hazard to personnel, and sufficient historical documentation exists.

Required surveys and documentation:

Documented direct surface contamination surveys (HP/IH) of the object(s) or container(s), as applicable.

Documented contamination swipe surveys (HP/IH/EA) of the object(s) or container(s), as applicable.

Completed Equipment/Property Release Form for each item (or container of related items), other than waste, that will be moved to new location.

Controls:

Materials and equipment should be segregated by color code prior to loading. A D&D H&S Technician (or RI-approved alternate) must verify proper color-coding on all materials removed for disposal as they are being loaded.

Level Three Release Protocol

A Level Three Release Protocol applies primarily to large or small projects in non-RMMA spaces that involve:

Few or no hazardous and/or radioactive materials that could pose an immediate hazard to personnel, and sufficient historical documentation exists.

Required surveys and documentation:

Informal direct surface contamination surveys (HP/IH) of the object(s) or container(s), as applicable.

Informal radioactive contamination (large area) wipe-surveys of the object(s) or container(s), as applicable.

IH metals swipes, per IH direction.

Note: If completed Equipment/Property Release Forms are required for any item, the abovementioned surveys must be documented.

Controls:

If unexpected contamination levels or amounts of hazardous materials are discovered, the RI will reevaluate the release protocol level.

Materials and equipment should be segregated by color code prior to loading.

A D&D H&S Technician (or RI-approved alternate) must verify proper color- coding on all materials removed for disposal as they are being loaded.

Level Four Release Protocol

A Level Four Release Protocol applies to projects in non-hazardous spaces that involve:

No known or expected hazardous and/or radioactive materials that could pose an immediate hazard to personnel; and

Sufficient historical documentation exists.

Required surveys and documentation:

Informal direct surface contamination surveys (HP/IH) of the object(s) or container(s), as applicable.

Informal radioactive contamination (large area) wipe-surveys of the object(s) or container(s), as applicable.

Green D&D label or sign posted at the entrance to the room indicates all unlabeled items in the room may be moved to the new location.

Red D&D label on items that are not to be moved.

Controls:

If unexpected contamination levels or amounts of hazardous materials are discovered, the RI will reevaluate the release protocol level.

The D&D H&S Technician will identify items that are not to be removed to the D&D co-workers prior to starting the move.

Property Relocation Requirements

The following steps apply to all projects regardless of Protocol Level:

1. The Project RI obtains a Sunflower Report sorted by building/trailer and room # just prior to demolition or room clean out. The web address is:

   (https://www-ais.llnl.gov/llnl_only/docs/bsd/property/reports.html)

2. On the day that the relocation begins, the Lead Laborer verifies status of property on report:

   Verify items on list actually located in room (with a check next to the property #)
   Record those items in room, not on list (Property # Only)
   Mark items on list not located in room (with a N/H)

3. The Client determines whether property will:

   Move to the new location (Bldg & Rm#) or
   Be released for disposal or
   Stay in room

4. The Lead Laborer records the end point status on the Sunflower Report.

5 If going to DUS, D&D will complete the Excess Equipment Form (LL6348) and have the responsible Property Center sign off on the form. A copy will go to the Property Center and be retained with the project file.

6. If property is moving to a new location, record new Building and Room # on Sunflower Report.

7. The Lead Laborer will obtain a signature from the Client on all release documents.

8. The project assigned D&D H&S Technician will approve the equipment release.

9. Once all notations have been placed on the Sunflower Report a copy will be sent to the Property Representative and the original will be filed in the project file.

10. Property SHALL NOT be moved until the property release form is signed by all parties and permission to disposition the property is given by the property representative.

Releasing Non-Hazardous Waste from D&D-owned WAAs for Disposal or Recycling

1. D&D Technicians request a signed Release Memo for numerous or complex groups of items or an email for a relatively small number of items from the D&D EA, with concurrence from the ES&H Team IH and/or HP, for waste items released for disposal or recycle.
2. The EA forwards a Release Memo with identification numbers or unique visual identification information for each release item to the D&D Technicians.
3. D&D Technicians will sort materials identified in the release memo into a segregated area separated from the remaining non-released materials.
4. D&D Technicians will verify that each sorted item is identified on the signed current release memo.
5. D&D H&S Technicians will physically mark the waste identified for release as follows:

   For DUS, mark with green code (without obscuring the identification number) and attach the Equipment/Property Release Form.

   For controlled municipal landfill, completely mark out the previous color code and apply a blue color code (without obscuring the identification number).

   For unrestricted municipal landfill or recycling, completely mark out the previous color code and apply a green color code (without obscuring the identification number).
6. As the items are loaded on the truck for transport, a D&D H&S Technician will perform the following final check:

   Compare and verify each identification number to the Release Memo, and

   Ensure that items loaded on the truck are correctly color-coded for the transport, and verify that hazardous material labels (i.e., radiation stickers, beryllium contamination labels, etc.) have been obliterated or otherwise removed.
7. The initialed Release Memo is returned to the Project RI.

Attachment G

Sample Plan for Waste Characterization

Attachment H

D&D Generic Standard Operating Procedures

H-1: Removal of Potentially Contaminated/Contaminated Ventilation Systems, Piping, and Associated Equipment

H-2: Removal of Potentially Contaminated/Hazardous Above-Grade Pipe

H-3: Removal of Potentially Contaminated/Hazardous Below-Grade Pipe

H-4: Removal of Potentially Contaminated Box-Type HEPA Filters

H-5: Dismantling and Removal or Maintenance of a Ventilation System Contaminated with Perchlorates

H-6: Vacuum Pump Disposition

NOTE: THE FOLLOWING GENERIC SOPs ARE TO BE FOLLOWED AS GUIDELINES. THE SOPs ARE TO BE CUSTOMIZED FOR <u>EACH</u> SPECIFC PROJECT.

ATTACHMENT H-1

REMOVAL OF POTENTIALLY CONTAMINATED/CONTAMINATED VENTILATION SYSTEMS, DUCTING, PIPING, AND ASSOCIATED EQUIPMENT

NOTE: This is the generic version of the SOP. This SOP should be reviewed and modified, as needed, for each specific project.

1.0 Reason For Issue

This SOP provides the necessary controls for the removal of potentially contaminated/contaminated ventilation system ducting, piping, and associated equipment (e.g., fans, damper valves and manifolds) located in facilities undergoing deactivation, decontamination, decommissioning, or demolition (D&D) activities. D&D activities involving ventilation system components are not currently covered by an active Facility Safety Plan (FSP) and are not explicitly controlled by other health and safety documentation. For the purpose of this SOP, these systems will be generically referred to as "components."

2.0 Work to be Done and Location of the Activity

2.1 Work to be Done

This safety plan is limited to ventilation system component removal efforts being performed by D&D personnel in buildings or facilities undergoing sanctioned D&D activities. Ventilation system component removal efforts generally entail:

- Identifying which specific components of a system will be removed;
- Performing hazard analyses based on current and historical system use and sample/survey results as stipulated by the appropriate D&D and ES&H Disciplines;
- Cutting and/or disassembling of ventilation system components to allow for additional characterization and removal;
- Storing ventilation components on an interim basis in a controlled lay-down area to allow for final characterization, analysis and review, size-reduction, and preparation for disposal; and
- Disposing of ventilation components in the most appropriate manner (e.g., reuse, storage, excess, scrap, hazardous waste and/or radioactive waste).

2.2 Location

Throughout the Laboratory main site (Site 200), Site 300 and Offsite (as reviewed, approved and authorized through an IWS) in support of D&D field operations.

3.0 Scope of Work to be Done

The scope of work involves the removal of potentially contaminated/contaminated ventilation systems, ducting, piping, and associated equipment removed from a facility during a D&D project.

4.0 Hazards Analysis & Controls

4.1 General hazards

General industrial hazards encountered during ventilation system component removal activities include:

- Working at elevated heights (i.e., greater than 6 feet high);
- Typical cutting and disassembly risks from falling components, debris and/or flying objects;
- Hazardous materials (e.g., asbestos, lead) that may be part of the ventilation construction and coating, insulation materials, or surrounding materials (e.g., walls, ceilings, concrete floors, solder joints and shavings);
- Inadvertent separation of ventilation components due to old age, insufficient support, or shifting due to unanticipated load balance changes;
- Littered and/or congested walking and working areas;
- Slips, trips, and falls;
- Cuts, bruises, & pinches;
- Potential confined spaces;
- Heat stress; and
- Fire.

Ventilation systems may be contaminated with hazardous and/or radioactive materials. Concentration of such materials is especially likely in exhaust system components (e.g., fans, damper valves and manifolds, high velocity turbulent zoned ducting bends and transition pieces). Removal of these components may involve the potential for worker exposure to:

- Acids (such as perchloric and nitric);
- Mercury (liquids and vapors) and skin contact where mercury can pass through the skin;
- Residual amounts of unanticipated chemicals/hazardous materials/high explosives located in previously inaccessible areas.
- Residual amounts of alpha, beta and gamma emitting radioactive materials;
- Residual amounts of other unspecified toxic materials (e.g., inorganic or organic substances);
- Biohazards;
- Unknown materials; and/or
- Disintegrated filters carrying hazardous media.

The potential loss of containment of loose radioactive contamination, residual explosive materials, and/or hazardous material inside ventilation system components could result in worker exposure or injury and environmental contamination from release of material to the ground or surrounding structures/areas.

The following controls will reduce the risk of general hazards:

4.1.1 The removal of ventilation systems shall be specified in the project specific IWS.

a. The history (maintenance, use, etc.) of each ventilation system shall be reviewed by the RI and ES&H Disciplines during the IWS review cycle.

b. The RI and ES&H Disciplines shall assess the current condition of potentially contaminated ventilation systems prior to the start of component removal. As a minimum, the following inspections shall be performed:

- Observe the area immediately underneath and about the ventilation system for discoloration or unnatural sediments or smell.
- Inspect the ventilation system for obvious damage.
- Survey the system components with an E-120, Blue Alpha Meter, organic vapor meter and mercury sniffer (and/or other instruments, as specified by the D&D and ES&H Disciplines).
- Evaluate the system for fatigue and integrity.

4.1.2 When there is insufficient ventilation system history or survey information, pre-disassembly sampling and surveys of internal surfaces may be performed (per EA/HP/IH/PM judgment) to confirm current contamination conditions (types and quantities) so that appropriate safety controls and sampling requirements may be established.

4.1.3 Based on the ventilation system history and current conditions, the ES&H Team Disciplines shall assign a level of contamination-specific controls required (e.g., none, low-level, or high-level). Control levels may be summarized as:

- <u>No contamination involved</u>. Process-specific contamination controls are not required. The D&D team may proceed utilizing standard, approved industrial safety controls.

- <u>Potential or Low-Level Contamination</u>. Ventilation system removal shall require the use of the contamination control procedure described in this SOP.

- <u>High-Level Contamination</u>. A dedicated SP shall be generated whenever the degree of contamination is determined to be high-level.

4.1.4 In the event that a ventilation system is determined to be or is discovered to be contaminated with perchlorates or other materials, which are potentially explosive, all work on the system shall STOP immediately and an Explosive

Safety Engineer notified. An evaluation to determine if the SOP for ventilation systems contaminated with perchlorates should be used instead.

4.1.5 The minimum Personnel Protective Equipment (PPE) requirements specified herein shall be confirmed as adequate or augmented by the ES&H Team Disciplines in the job-specific safety documentation [IWS and/or associated hazard assessment and control document, SP, etc.].

The minimum PPE requirements for workers cutting, removing and handling potentially contaminated or low-level contaminated ventilation system ducting, piping or components is as follows:

- Leather/heavy gloves over high-grade Latex®-free (or equivalent) gloves
- Safety shoes or stout work boots
- Shoe covers
- Safety glasses with side shields (when using a half-mask respirator)
- Tyvek®(or approved alternative), Laboratory issue coveralls, or lab coat
- Half-mask respirator (minimum)
- Hood (or equivalent)
- Face-shield, when mechanical cutting of ventilation components is necessary
- Hard-hat

  NOTE: The hard-hat requirement may be waived with written approval from the ES&H Team Industrial Safety Engineer.

4.1.6 All Asbestos Containing Materials (ACMs) shall be abated under the auspices of an Asbestos Work Permit approved by the Industrial Hygienist and within the time frame and specified abatement method outlined in the BAAQMD or SJVUAPCD asbestos notification.

4.1.7 The preferred method of ventilation system disassembly is from the influent (hood or intake plenum) to the effluent (fan exhaust or stack), with continuous exhaust flow (i.e., system negative pressure) as the system is being dismantled.

a. The exhaust flow should be maintained on the ventilation system only as long as safe and practical during the disassembly process. The ES&H Team Disciplines shall determine what constitutes safe and practical exhaust flow operations during system disassembly on a case-by case basis.

4.1.8 Whenever disassembling contaminated or potentially contaminated systems or components where the potential for the dispersal of wind-borne particulate

contamination is possible, a temporary enclosure should be erected. The need for and type of the enclosure will be determined on a case-by-case basis.

a. The temporary enclosure shall be equipped with a HEPA-filtered exhaust ventilation system. The exhaust ventilation system shall have sufficient volumetric airflow to create and maintain a pressure differential greater than or equal to -0.02 inches of water within the enclosure, when measured with respect to the area outside the enclosure.

b. A calibrated recording pressure monitor shall be used to monitor the pressure differential between the enclosure and the outside. The monitor shall be equipped with an alarm set to trigger whenever the pressure differential falls below -0.02 inches of water.

   NOTE: If alarm sounds, work is to STOP until the source of the alarm can be identified and remediated.

c. Each time the pressure differential falls below -0.02 inches of water, the RI, or designee, shall annotate the pressure monitor's record with the reason for the loss of pressure, and initial the annotation.

d. Pressure records shall be collected on a weekly basis. A photocopy of the record shall be forwarded to the ES&H Team Industrial Hygienist for review. The original record shall be maintained as part of the operational log.

e. Each day this work is performed, the function of the pressure monitor shall be checked by the workers with a Magnahelic gauge or incline manometer before the start of work. The monitor should be allowed to alarm at its pre-selected setpoint (e.g., -0.02 inches of water). The Magnahelic or manometer should be used to verify the "calibration" at that setpoint. If the monitor does not perform as expected, work shall not commence until a properly functioning pressure monitor is installed.

f. When there is potential for radioactive airborne contamination, a continuous air monitor (CAM) shall be used, per the ES&H Team Health Physicist's discretion, to provide immediate warning to the workers of radioactive airborne conditions.

   NOTE: When a CAM alarms, workers shall immediately stop work, exit the area or retreat to a pre-determined holding area, and notify the Health & Safety Technician.

4.1.9 The following equipment and materials are typically needed for ventilation system removal tasks and should be readily available during removal activities:

- Appropriate hand tools (e.g., wrenches, breaker bars and hand-held power saws)
- Sheet plastic/Herculite® and/or heavy gage paper sheeting

- Plastic bags (for sealing pipe and/or ducting ends, fan inlet and outlet plenums, valve flanges or other component openings)
- Tape
- Indelible ink pen (to identify ventilation system components or parts)
- Wipes (for decontamination and/or surveys)
- Mercury HEPA-filtered vacuum (when mercury is suspected)
- Mercury spill kit (when mercury is suspected)
- Absorbent material
- Plastic waste bags and containers
- Radiological monitoring equipment, as appropriate (e.g., two Micro R meters, Blue Alpha meters, E-120 meters with pancake probes.)
- Mercury Sniffer
- Organic Vapor Meter/Photo-Ionization Detector
- Other appropriate survey instruments
- pH paper
- Methylene Blue (Perchlorate detection)
- Three quarter-inch thick plywood or fitted sheet metal ventilation penetration covers
- Glassine bags and swipe tabs (as needed)
- Contaminated waste receptacle(s) (segregated for RAD and NON-RAD, as appropriate)
- Appropriate radiation/contamination labels
- Enclosure with HEPA-filtered exhaust fan and negative pressure monitor (as required by the D&D AND ES&H Disciplines)
- CAM (as required by the Health Physicist)
- Spare PPE (e.g., gloves, shoe covers, and Tyvek®)

4.1.10 A controlled work area shall be clearly established to prevent the migration of contaminants from the work site whenever cutting and removing potentially contaminated or contaminated ventilation system components.

4.1.11 Where materials and ventilation system components are being raised and lowered to the ground from an elevation (e.g., a roof or platform); an exclusion area shall

be established at grade level to preclude the inadvertent access of unauthorized personnel.

The following controls shall be employed, per ES&H Team confirmation in the IWS/safety documentation, for removing low-level potentially contaminated ventilation systems. These controls may be upgraded by the ES&H Team during IWS review or removal operations as contamination conditions warrant.

Planning Period

4.1.12 A ventilation system-specific disassembly plan shall be completed prior to prestart and approval to proceed.

a. The typical plan will include:

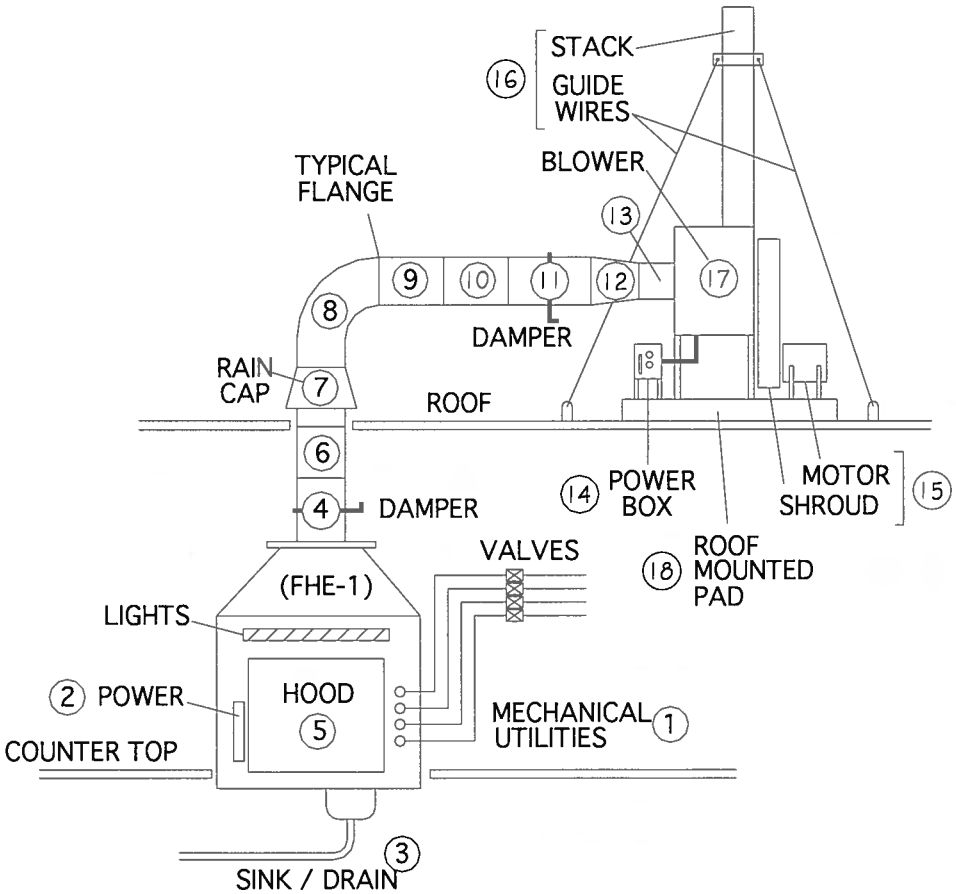
- sequence of disassembly
- numbering plan
- starting point/end point
- Lockout & Tagout (LOTO)
- survey & test points
- methodology (e.g., cutting, unbolting)
- non essential equipment removal (e.g. shrouds, pulleys, electrical motors)

b. The intended separation areas and component removal order shall be reviewed by the Industrial Safety Engineer to ensure adequate support is planned for the changing load balances.

NOTE: As is practical, heavy components such as fans and damper valves should be separated from ducting or piping runs prior to their disassembly.

NOTE: Wherever practical, the components shall be disassembled at existing joints versus being cut. In situations where ducting and piping runs are extensive, saw cutting may be considered.

EXAMPLE: HOOD DISASSEMBLY NUMBERING PLAN



BLDG. X Y Z -FHE 1

#	ITEM
Z-1-1	INTERIOR UTILITIES
Z-1-2	INTERIOR POWER
Z-1-3	DRAIN
Z-1-4	INTERIOR DAMPER
Z-1-5	HOOD
Z-1-6	INTERIOR DUCT
Z-1-7/-13	EXT. DUCT REMOVAL
Z-1-8	EXT. ELBOW DUCT
Z-1-9	EXT. BLOWER DUCT
Z-1-10	EXT. BLOWER DUCT
Z-1-11	EXTERIOR DAMPER
Z-1-12	EXT. BLOWER DUCT
Z-1-14	EXTERIOR POWER
Z-1-15	MOTOR / SHROUD
Z-1-16	GUIDE WIRES / STACK
Z-1-17	BLOWER
Z-1-18	PAD

TYPICAL HOOD DISASSEMBLY

4.1.13 In situations where there is NO likelihood for the spread of particulate contamination (e.g., radioactive materials, Beryllium, lead); the H&S Technician shall assure that the work areas have adequate ventilation (e.g., doors and windows opened or cracked open).

4.1.14 Whenever working within a room or area on ventilation systems above chest height, temporary scaffolding shall be employed to provide a steady platform for workers to perform separation activities.

4.1.15 Whenever working within 6 feet of the edge of an elevation that is greater than 6 feet high (e.g., a roof or platform edge), fall protection shall be utilized as specified by the ES&H Team Industrial Safety Engineer.

Set Up Period

4.1.16 Establish an interim lay-down area to stage the ventilation system components for subsequent transfer to the waste area. The lay-down area(s) shall be controlled to mitigate the spread of contamination.

CAUTION: Sheet plastic can be a slip hazard, especially when wet. In situations where sheet plastic could result in a significant slip hazard, a heavy gage paper sheeting, or a Herculite® sheet shall be utilized. (Fire resistant plastic shall be used.)

4.1.17 Install dunnage, as approved by the ES&H Team Industrial Safety Engineer in the job-specific ventilation disassembly plan.

Execution Period

NOTE: Prior to initiating any activities, the PM shall conduct a prestart meeting, review the IWS and/or job specific safety documentation, disassembly plan, and request permission to proceed.

4.1.18 Clear all equipment and non-structural components from the immediate area of the ventilation system to be removed such that it is clearly visible and easily accessible.

4.1.19 Prior to initiating disassembly, the H&S Technician shall survey the intended separation area with a Micro R or E-120 (or equivalent) meter so that cuts are made in areas of lesser radioactive content.

NOTE: In places where the accumulation of contaminants may be significant (or pure alpha emitters may be present, a pilot hole may be drilled into the ventilation system and the drill bit checked for contaminants. (This action requires prior ES&H review & approval.)

4.1.20 DO NOT heat ducts, pipes or components during separation activities. If torch cutting or similar operations are needed, further hazards review is required. Notify the ES&H Team Disciplines.

4.1.21 Start disassembly or saw cutting until the ventilation system segment is separated enough to perform an initial inspection for contaminants. The H&S Technician shall access the separation to perform, at a minimum:

- a radiological direct survey;
- a radiological contamination check; and
- a pH test using litmus paper.

CAUTION: Under no circumstance are any of the workers to place their hands or other body parts in a position where there is a danger of being injured by a sharp piece of metal or slipping load.

CAUTION: If radiological contamination levels greater than ten times those anticipated in the IWS/HA are encountered, or unanticipated radiation types or material forms are found, **STOP WORK** immediately and notify the Hazards Control Health Physicist.

CAUTION: Be watchful for signs of crystals or "frosted" materials that are indicative of perchlorates or other explosives material. If observed, **STOP WORK** immediately and call the Explosives Safety Engineer for a thorough evaluation. See section 4.1.4,

CAUTION: Be prepared for breakage or inadvertent separation due to failure caused by old age, insufficient support, shifting due to unanticipated load balance changes.

4.1.22 Survey the immediate area of the pipe separation for radioactive and/or hazardous materials (as appropriate). If contaminated, clean all potentially contaminated residues adhering to the tools or saw.

4.1.23 The H&S Technician shall perform periodic personnel surveys for radioactivity (as appropriate) and shall survey and/or visually check for other suspect contaminants.

4.1.24 The RHWM Sampling Technician shall acquire duct, pipe or component interior samples under the direction of the ES&H Team EA as necessary for proper characterization and disposal.

NOTE: The H&S Technician may perform characterization sampling for equipment having low potential for process contamination, per the EA discretion and instructions.

4.1.25 Collect any residue that may have been generated in the cutting process. Whenever possible, the RHWM Sampling Technician shall also acquire samples of residual cuttings and/or debris.

4.1.26 Cover the open end(s) of the ventilation system duct, pipe or component with a plastic bag and seal with tape. When appropriate, employ metal or plywood blank flanges and then cover with a plastic bag and seal with tape. The H&S Technician shall verify that no radioactive contamination exists on the exterior plastic sleeve or blank flange via the gross swipe technique.

NOTE: When necessary, clean the item where the tape is to be used to make sure the tape will stick. Treat the cleaning wipes as contaminated waste.

4.1.27 Move the wrapped item from the work area to the designated lay-down area. If necessary, continue to size-reduce and characterize the component segments under the same applicable controlled conditions as stipulated above. The D&D HWM Technician must notify the H&S Technician prior to sampling or size-reducing any staged items.

4.1.28 Once clear, the exposed ventilation penetration (through the roof or platform) will be covered with a three quarter-inch thick plywood secured cover or capped with a fitted sheet metal fixture to protect the facility from rain and employees from an open roof penetration. Such covers will be labeled "hole".

4.1.29 All equipment/tools shall be visually inspected, surveyed and swiped by the H&S Technician for radioactive and suspected hazardous contamination prior to release from the work area.

4.1.30 All personnel shall perform a whole-body contamination survey prior to leaving the work separation area, as appropriate.

4.1.31 All personnel shall wash hands and face before lunch, breaks, or leaving work.

Post Disassembly & Clean Up

4.1.32 With H&S Technician coverage, workers shall roll the plastic or paper sheet inward to prevent dispersal of any potential loose contaminants and dispose of the roll as waste.

4.1.33 The ventilation system separation area shall be surveyed by the H&S Technician for radioactive and other suspected hazardous contamination, as appropriate, prior to its release for uncontrolled access.

4.1.34 All wastes shall be collected and disposed of in the manner stipulated by the EA.

4.1.35 The removed components shall be marked for disposal with the known and/or potential contaminant type(s) and approximate levels as determined from process knowledge and direct sampling/surveying information.

4.1.36 Contaminated ventilation system components shall be prepared for interim storage by RHWM.

NOTE: Notify the FPOC that these actions are complete. Update the building electrical drawings, Real Property Installed Equipment List, Discipline Action Plan, and other building data files.

5.0 General Hood Removal Procedure

Additional PPE Requirements

5.1 PPE requirements for general hood disassembly and removal activities are the same as those specified in section 4.0.4 of this attachment with the following exception:

- When using a "Sawzall" saw (or similar device) to cut the ducting, the saw operator shall wear either a HEPA-filtered half-mask respirator with safety glasses or goggles *OR* a HEPA-filtered full-face respirator.
- Respirator usage for other general hood disassembly activities will be determined by the ES&H Team Disciplines based on hood contamination conditions.

General Removal Plan

NOTE: Hood removal activities are not to begin until IH and HP pre-start surveys are complete (as determined necessary by the ES&H disciplines). Survey results must be reviewed by the IH and HP and any outstanding issues addressed prior to initiating hood disassembly activities.

NOTE: The following actions do not necessarily need to be performed in chronological order, unless specified in the job-specific IWS or safety documentation.

5.2 Isolate utilities to the hood. Apply Lockout/Tagout Procedure requirements as appropriate.

5.3 Disconnect utilities to the hood.

5.4 Remove both the front and side fascia plates to enable access to the hood's interior upper deck and side areas.

- Perform direct surveys and gross swipes for radiological contaminants of the exposed hood interior areas and inside fascia surfaces as each fascia plate is removed.
- Perform direct surveys for mercury on newly exposed surfaces.
- Inspect interior areas for other potential contamination (e.g., explosives and metals residue).

5.5 Disconnect the fume hood exhaust duct(s) from the hood by either unbolting/unscrewing the flange connection (preferred); or cutting the ducting using a "Sawzall" saw (alternate). When cutting the ducting with a "Sawzall" saw, direct survey (radiological) and gross swipe the saw blade after making the initial penetration cut and after completing the cut.

5.6 Perform direct surveys (radiological and mercury) and gross swipes of the duct interior as soon as the interior ductwork is accessible. Inspect interior areas for other potential contamination.

CAUTION: If unexpected high radiological and/or mercury contamination levels are encountered, STOP WORK and call the Health Physicist and/or Industrial Hygienist as appropriate.

5.7 Pull the hood forward and away from the wall. Survey (radiological and mercury) and gross swipe all newly exposed areas (e.g., back wall, back of hood and floor area). Inspect for other potential contamination (e.g. explosives, metals residue, etc.).

5.8 Perform and document characterization/release surveys and sampling, per ES&H Team Discipline instructions.

5.9 Cap or wrap the open ends of the duct(s) to preclude the potential spread of contaminants.

5.10 Transport the hood to the new location (re-use, DUS, etc.).

5.11 The work area shall be surveyed by the H&S Technicians for radioactive and other suspected hazardous contamination, as appropriate, prior to release for uncontrolled access.

ATTACHMENT H-2

REMOVAL OF POTENTIALLY CONTAMINATED/HAZARDOUS ABOVE-GRADE PIPE

NOTE: This is the generic version of the SOP. This SOP should be reviewed and modified, as needed, for each specific project.

1.0 Reason For Issue

This SOP provides the necessary controls for the removal of potentially contaminated or contaminated pipe located above-grade in facilities undergoing deactivation, decontamination, decommissioning, and demolition (D&D) activities. D&D activities for the removal of above-grade pipes are not currently covered by an active Facility Safety Plan (FSP) and are not explicitly controlled by other health and safety documentation.

2.0 Work to be Done and Location of the Activity

2.1 Work to be Done

This SOP is limited to above-grade pipe removal efforts being performed by D&D personnel in buildings or facilities undergoing sanctioned D&D activities. Typically above-grade pipe removal efforts entail:

- Exposing pipe in preparation for removal;
- Cutting and/or disassembly of pipe-runs into sections for easy removal;
- Interim storage of sectioned pipe in a plastic covered lay-down area for sampling/surveying; and
- Cutting the pipe into short sections to facilitate sampling and disposal.

2.2 Location

Throughout the Laboratory main site (Site 200), Site 300 and Offsite (as reviewed, approved and authorized through an IWS) in support of D&D field operations.

3.0 Scope of Work to be Done

The scope of work involves the removal of Potentially Contaminated/Hazardous Above-Grade Pipe removed from a facility during a D&D project.

4.0 Hazards Analysis & Controls

4.1 General Hazards

General hazards encountered during pipe removal activities include:

- Working at elevated heights (i.e., greater than 6 feet high)
- Typical pipe cutting and disassembly risks from falling components, debris and/or flying objects;
- Hazardous materials (e.g., asbestos and lead) that may be part of the pipe construction and coating, insulation materials, or surrounding materials (e.g., walls, concrete floors, solder joints and shavings).
- Littered and/or congested walking and working areas;
- Slips, trips, and falls;
- Cuts, bruises, & pinches;
- Heat stress; and
- Fire.

Above-grade piping systems (e.g., sewer drains, retention tank drains, and vent lines) may be contaminated with hazardous and/or radioactive materials. Concentration of such materials is especially likely in line bends and traps. Removal of such piping systems may involve the potential for worker exposure to:

- Mercury (liquid or vapors);
- Acids (such as perchlorics and nitric);
- Residual amounts of unanticipated chemicals/hazardous materials/high explosives located in previously inaccessible areas;
- Residual amounts of alpha, beta and gamma emitting radioactive materials;
- Residual amounts of other unspecified toxic materials (e.g., inorganic or organic substances);
- Biohazards; and/or;
- Unknown material.

The potential loss of containment of loose radioactive contamination, residual explosive materials, and/or hazardous material inside piping could result in worker exposure or injury and environmental contamination from release of material to the ground.

The following controls will reduce the risk of general hazards:

4.1.1 The removal of piping systems shall be specified in the project specific IWS.

a. The history (maintenance, use, etc.) of each piping system shall be reviewed by the D&D Responsible Individual and ES&H Team Disciplines during the IWS review cycle.

b. The current condition of the piping systems should be assessed during the IWS development. As a minimum, the following inspections should be performed:

- Observe accessible piping surfaces for discoloration or unnatural sediments or smell.
- Inspect accessible surfaces for obvious damage.
- Survey accessible surfaces and openings with an E-120, Blue Alpha Meter, organic vapor meter and mercury sniffer (and/or other instruments, as specified by the ES&H Team Disciplines).
- Evaluate the system for fatigue and integrity (as practical).

c. Further ES&H review, documentation, and control requirements, as necessary, will be specified by the D&D and ES&H Disciplines as conditions dictate and as systems are exposed.

d. Prior to initiating the removal of above-grade piping systems, the Responsible Individual will ensure all SSCs are properly color-coded. As the building is peeled exposing hidden lines the Responsible Individual shall ensure newly exposed SSCs are properly color-coded to reflect the hazard of the exposed lines.

4.1.2 When there is insufficient system history or survey information, pre-disassembly sampling of internal surfaces may be performed (per EA/HP/IH/PM judgment) to confirm current contamination conditions (types and quantities) so that appropriate safety controls and sampling requirements may be established.

4.1.3 The minimum Personnel Protective Equipment (PPE) requirements specified herein shall be confirmed as adequate or augmented by the ES&H Team Disciplines in the job-specific safety documentation [IWS and/or associated hazard assessment and control document, SP, etc.].

The minimum PPE requirements for workers cutting, removing and handling potentially contaminated or contaminated piping are as follows:

- Leather/heavy gloves over high grade Latex®-free (or approved alternative) gloves
- Safety shoes or stout work boots
- Shoe covers

- Safety glasses with side shields
- Face shields (when there is the reasonable expectation for the release of fluids or when using a hand-held power saw).
- Lab coats, Laboratory issued coveralls, or Tyvek® (or approved alternative)
- Hard-hats

  NOTE: The hard-hat requirement may be waived with written approval from the ES&H Team Industrial Safety Engineer.

4.1.4 The following equipment and materials are typically needed for piping system removal tasks and should be readily available during removal activities:

- Pipe cutter or hand-held power saw
- Sheet plastic/Herculite® and/or heavy gauge paper sheeting
- Plastic bags (for sealing pipe ends)
- Tape
- Indelible ink pen (to identify pipe pieces)
- Wipes (for decontamination and/or surveys)
- HEPA-filtered vacuum, or Mercury HEPA-filtered vacuum, when mercury is suspected
- Mercury spill kit, when Mercury is suspected
- Absorbent material
- Plastic waste bags and containers
- Radiological monitoring equipment, as appropriate (e.g., two Micro R meters, Blue Alpha meters and E-120 meters with pancake probes)
- Mercury Sniffer
- Organic Vapor Meter/Photo-Ionization Detector
- Other appropriate survey instruments
- pH paper
- Methylene Blue (Perchlorate detection)
- Glassine bags and swipe tabs (as needed)
- Contaminated waste receptacle(s) (segregated for RAD and NON-RAD, as needed)

- Appropriate radiation/contamination labels
- Spare PPE (e.g., gloves, shoe covers, and Tyvek®)

4.1.5 Whenever cutting and removing potentially contaminated or contaminated piping, a controlled work area shall be clearly established to prevent the migration of contaminants from the work site.

4.1.6 Establish an interim lay-down area to stage the piping system components for subsequent transfer to the waste area. The lay-down area(s) shall be controlled to mitigate the spread of contamination.

CAUTION: Sheet plastic can be a slip hazard, especially when wet. In situations where sheet plastic could result in a significant slip hazard, a heavy gage paper sheeting, or a Herculite® sheet shall be utilized. (Fire resistant plastic shall be used.)

4.1.7 Whenever working on piping or piping systems suspected of being contaminated with mercury, the H&S Technician shall monitor for mercury vapors whenever there is a potential for personnel exposure (e.g., when checking newly uncovered pipe runs; when making new pipe breaks; and/or releasing equipment, materials or areas).

4.1.8 Whenever working on piping on piping systems suspected of containing or containing large amounts of mercury, contact the ES&H Team Industrial Hygienist for task-specific instructions. The following precautions are recommended:

1. Whenever possible, place a catch basin made of smooth impervious materials (such as plastic or smooth-finish paint), large enough to contain the greatest amount of mercury that could spill and have sufficient dimensions to catch mercury droplets escaping from any plausible direction.

2. Felt mats or horsehair mats can be put on seamless plastic sheets laid in catch pans to catch the droplets from mercury spills. The droplets can then be collected by simply wrapping up the plastic with the mat still inside and disposing of it as mercury waste.

3. Stage the mercury HEPA filtered vacuum cleaner and mercury spill kit for quick deployment to the pipe separation area.

4. Avoid heating pipes that may contain mercury. If torch cutting or similar operations are required, contact the ES&H Team Industrial Hygienist for a task-specific hazard analysis.

   NOTE: Use of a torch is not an option if energetic materials are suspected in the area and / or mercury is suspected in the pipe.

5. Avoid walking on or touching surfaces contaminated with mercury.

6. If a mercury spill can not be cleaned up immediately, establish an exclusion area and post it with CAUTION signs stating, "Mercury Spill Area-Keep Out."

Controls (Procedural)

4.1.9 In situations where there is no likelihood for the spread of particulate contamination (e.g., radioactive materials, Be powders, lead dusts); the H&S Technician shall assure that the work areas have adequate ventilation (i.e., doors and windows opened or cracked open).

4.1.10 Clear all equipment and non-structural components from the immediate area of the pipe such that it is clearly visible. Observe the floor underneath or about the pipe for discoloration, liquids or unnatural sediments. Perform surveillance's (to verify/enhance those performed in step 4.0.1) of the piping to be removed for any obvious damage and survey its length with an E-120, Blue Alpha Meter, organic vapor meter and mercury sniffer (or equivalents, as appropriate).

CAUTION: If unanticipated discoloration, liquids, unnatural sediments or external radioactive or mercury contamination are identified, STOP work on the piping and immediately call the appropriate ES&H Team discipline. The discipline shall review the operation and recommend additional controls and/or PPE (as necessary).

4.1.11 Place plastic sheeting under the pipe section to be separated such that it will collect any residue that may be inside the pipe at the point of separation. The H&S Technician shall survey and inspect the intended pipe separation area so that cuts are made in areas of minimal radioactive/hazardous material content.

CAUTION: Be prepared for pipe breakage or inadvertent pipe separation due to failure caused by old age or the pipe's inability to support its own weight.

4.1.12 Prepare to separate the pipe. **DO NOT** initiate the cut until step 4.1.5 is complete.

a. If using a hydraulic pipe cutter, place the cutter around the pipe and tighten as much as possible without engaging the hydraulic pump on the unit.

b. If using a hand-held pipe cutter, set the cutter over the point of separation without initiating the cut.

c. If using a hand-held power saw, the saw operator shall don a protective face-shield. Any other workers either directly beneath the cut or within 6 feet of the cut shall also don a face shield.

4.1.13 Place an appropriate plastic protective shield over the cutter at the point of separation to minimize aerosol dispersion as directed by the appropriate ES&H Team discipline.

4.1.14 Actuate the pump on the cutter until the pipe is separated. If using a hand-held cutter, start cutter rotation until the pipe is separated.

CAUTION: (1) Be watchful for signs of white or yellow crystals that are indicative of explosive materials. If observed, **STOP** work immediately and call the D&D Explosives Safety Engineer for a thorough evaluation. (2) Avoid heating pipes that may contain mercury.

4.1.15 Survey the immediate area of the pipe separation for radioactive and/or hazardous materials (as appropriate).

4.1.16 Remove the plastic protective shield. Clean all potentially contaminated residues adhering to the saw, pipe cutter and protective shield with cloth or paper wipes.

4.1.17 The HWM Sampling Technician shall acquire pipe interior samples as necessary to adequately characterize the pipe being removed.

CAUTION: If explosive contamination is suspected, contact the Explosive Safety Engineer immediately. Do not continue with the operation until the material has been identified.

NOTE: The H&S Technician may perform characterization sampling for equipment having low potential for process contamination, per the EA discretion and instructions.

4.1.18 Collect any residue that may have been generated in the cutting process. Use absorbent material and plastic bags to clean any wet material exposed as a result of the pipe separation process.

4.1.19 Cover the cut end of the pipe with a plastic bag (or equivalent) and seal the pipe ends (gooseneck) with tape. The H&S Technician shall verify that no contamination is on the exterior plastic sleeve.

NOTE: If necessary, clean a small area of the pipe where the tape is to be used to make sure the tape will stick.

CAUTION: Only clean a portion of pipe that does not contain any external contaminants and can withstand the extra handling without breaking.

4.1.20 Move the wrapped pipe from the work area by hand or mechanical means to the designated lay-down area. If necessary, continue to size-reduce and characterize the pipe segments under the same applicable controlled conditions as stipulated above. The HWM Technician must notify the H&S Technician prior to sampling or size-reducing any bagged piping.

4.1.21 All equipment and tools shall be visually inspected, surveyed and swiped by the H&S Technician for radioactive and suspected hazardous contamination prior to release from the work area.

4.1.22 All personnel shall perform a whole-body contamination survey prior to leaving the work area, as appropriate.

4.1.23 The pipe separation area shall be surveyed by the H&S Technician for radioactive and suspected hazardous contamination, as appropriate, prior to its release for uncontrolled access.

4.1.24 All personnel shall wash hands and face before lunch, breaks, or leaving work.

ATTACHMENT H-3

REMOVAL OF POTENTIALLY CONTAMINATED/HAZARDOUS BELOW-GRADE PIPE

NOTE: This is the generic version of the SOP. This SOP should be reviewed and modified, as needed, for each specific project.

1.0 Reason For Issue

This SOP identifies the hazards and provides the necessary controls for the removal of potentially contaminated hazardous pipe located below-grade in facilities undergoing deactivation, decontamination, decommissioning, and demolition (D&D) activities. D&D activities for the removal of below-grade pipes are not currently covered by an active Facility Safety Plan (FSP) and are not explicitly controlled by other health and safety documentation.

2.0 Work to be Done and Location of the Activity

2.1 Work to be Done

Each building undergoing D&D will be: fully scanned to identify buried lines, the lines will be identified, and the floor will be spray painted showing the type & location of each buried line.

This safety plan is limited to below-grade pipe removal efforts being performed by D&D personnel in buildings or facilities undergoing-sanctioned D&D activities. Typically below-grade pipe removal efforts entail:

- Exposing pipe in preparation for removal (i.e., manually unearthing using shovels);
- Extraction of pipe segments (with backhoe or similar equipment as appropriate);
- Interim storage of pipe in a plastic covered lay-down area for sampling/surveying; and
- Cutting the pipe into short sections to facilitate sampling and disposal.

2.2 Location

Throughout the Laboratory main site (Site 200), Site 300 and Offsite (as reviewed, approved and authorized through an IWS) in support of D&D field operations.

3.0 Scope of Work to be Done

The scope of work involves the removal of Potentially Contaminated/Hazardous Below-Grade Pipe removed from a facility during a D&D project.

4.0 Hazards Analysis & Controls

4.1 General Hazards

General hazards encountered during pipe removal activities include:

- Working with or in close proximity of heavy equipment (e.g., backhoes, fork trucks, and excavators);
- Typical pipe cutting and disassembly risks from falling components, debris and/or flying objects;
- Hazardous materials (e.g., asbestos and lead) that may be part of the pipe construction and coating, insulation materials, or surrounding materials (e.g., walls, concrete floors, solder joints and shavings);
- Littered and/or congested walking and working areas;
- Slips, trips, and falls;
- Cuts, bruises, & pinches;
- Confined spaces;
- Heat stress; and
- Fire.

Below-grade piping systems (e.g., sewer drains, retention tank drains) may be contaminated with hazardous and/or radioactive materials. Concentration of such materials is especially likely in line bends and traps. Removal of such piping systems may involve the potential for worker exposure to:

- Mercury (liquid or vapors);
- Acids (such as perchlorics and nitric)
- Residual amounts of unanticipated chemicals/hazardous materials/high explosives located in previously inaccessible areas;
- Residual amounts of alpha, beta and gamma emitting radioactive materials;
- Residual amounts of other unspecified toxic materials (e.g., inorganic or organic substances);
- Biohazards; and/or
- Unknown materials.

The potential loss of containment of loose radioactive contamination, residual explosive materials, and/or hazardous material inside piping could result in worker exposure or injury and environmental contamination from release of material to the ground.

Whenever penetrating soil and concrete slabs there is the potential for inadvertent contact with significant hazards (e.g., live electrical conductors, process contaminated pipes, natural gas lines, water lines, and air lines). Such inadvertent contact presents the potential for injury or death to personnel, the disruption of essential services, harm to the environment, and damage to real property.

The following controls will reduce the risk of general hazards:

4.1.1 The removal of piping systems shall be specified in the project specific IWS.

a. The history (maintenance, use, etc.) of each piping system shall be reviewed by the Responsible Individual and ES&H Team Disciplines during the IWS review cycle.

b. The current condition of the piping systems should be assessed during the IWS development. As a minimum, the following inspections should be performed:

- Observe accessible piping surfaces for discoloration or unnatural sediments or smell.
- Inspect accessible surfaces for obvious damage.
- Survey accessible surfaces and openings with an E-120, Blue Alpha Meter, organic vapor meter and mercury sniffer (and/or other instruments, as specified by the ES&H Team Disciplines).
- Evaluate the system for fatigue and integrity (as practical).

c. When there is insufficient system history or survey information, pre-disassembly sampling of internal surfaces may be performed (per EA/HP/IH/PM judgment) to confirm current contamination conditions (types and quantities) so that appropriate safety controls and sampling requirements may be established.

d. Further ES&H review, documentation, and control requirements, as necessary, will be specified by the ES&H Team Disciplines as conditions dictate and as systems are exposed.

e. Prior to initiating the removal of below-grade piping systems the Responsible Individual will ensure line location has been completed, below-grade lines are identified and clearly marked using the National Standard. As the building is peeled exposing buried lines the Responsible Individual shall ensure newly exposed SSCs are properly color-coded to reflect the hazard of the exposed lines.

4.1.2 Prior to beginning any excavation/penetration action in soil where utilities may be located, Plant Engineering Maintenance Operations Procedure (MOP) No. MOP-02003 entitled "Soil Excavation (Digging, Grading, Tunneling, Trenching, and/or

Drilling) Permit Procedure" shall be employed. If permits are issued they must be posted. The area to be surveyed is to be delineated.

4.1.3 Prior to beginning any penetration action in concrete floors, slabs, walls and/or ceilings greater than 3 inches in depth in buildings or areas where utilities may be located, Plant Engineering Maintenance Operations Procedure (MOP) No. MOP-03001 entitled "Concrete Structure (Floor, Wall, And Ceiling) Penetrations Permit Procedure" shall be employed. If permits are issued they must be posted at the job site.

4.1.4 Facilities undergoing D&D shall be scanned prior to beginning any penetration action in concrete floors, slabs, walls, and/or ceilings less than 3 inches in depth in buildings or areas where utilities may be located. The worker shall assure that the proposed work area is investigated for the presence of embedded utilities.

a. Natural gas lines: Work on natural gas lines shall be in accordance with applicable NFPA and LLNL guidelines.

b. Unknown lines: When unknown lines are encountered, work on those lines shall cease until the history or the hazards of the line can be identified.

Before buildings are peeled, tile removed, etc. line location shall be employed and completed. Minimally, a hand-held scanner capable of detecting metal and interior wiring in concrete to a depth of 3 inches shall be used.

4.1.5 The minimum Personnel Protective Equipment (PPE) requirements specified herein shall be confirmed as adequate or augmented by the D&D and ES&H Disciplines in the job-specific safety documentation [IWS and/or associated hazard assessment and control document, SP, etc.].

The minimum PPE requirements for workers cutting, removing, and handling potentially contaminated or contaminated piping are as follows:

- Leather/heavy gloves over high-grade Latex® (or approved alternative) gloves
- Safety shoes or stout work boots
- Shoe covers
- Safety glasses with side shields
- Tyvek®(or approved alternative), Laboratory issued coveralls, or lab coat
- Face shield when mechanical cutting is performed
- Hard hat

NOTE: The hard-hat requirement may be waived with written approval from the Industrial Safety Engineer.

4.1.6 The following equipment and materials are typically needed for piping system removal tasks and should be readily available during removal activities:

- Pipe cutter
- Sheet plastic/Herculite® and/or heavy gauge paper sheeting
- Plastic bags (for sealing pipe ends)
- Tape
- Indelible ink pen (to identify pipe pieces)
- Wipe (for decontamination and/or surveys)
- HEPA-filtered vacuum, or Mercury HEPA-filtered vacuum, when mercury is suspected
- Mercury spill kit (when mercury is suspected)
- Absorbent material
- Plastic waste bags
- Radiological monitoring equipment, as appropriate (e.g., two Micro-R meters, Blue Alpha meters, Tritium Sniffer, and E-120 meters with pancake probes)
- Mercury Sniffer
- Organic Vapor Meter/Photo-Ionization Detector
- Other appropriate survey instruments
- pH paper
- Methylene Blue (Perchlorate detection)
- Glassine bags and swipe tabs, as needed
- Contaminated waste receptacle(s) (segregated for RAD and NON-RAD, as needed)
- Appropriate radiation/contamination labels
- Spare PPE (e.g., gloves, shoe covers, and Tyvek®)
- Shovels

4.1.7 Whenever cutting and removing potentially contaminated or contaminated piping, a controlled work area shall be clearly established to prevent the migration of contaminants from the work site.

4.1.8 Establish an interim lay-down area to stage the piping system components for subsequent transfer to the waste area. The lay-down area(s) shall be controlled to mitigate the spread of contamination.

CAUTION: Sheet plastic can be a slip hazard, especially when wet. In situations where sheet plastic could result in a significant slip hazard, a heavy gage paper sheeting, or a Herculite® sheet shall be utilized. (Fire resistant plastic shall be used.)

4.1.9 In the event that torch cutting or similar operations are required, contact the appropriate ES&H Team Discipline.

NOTE: Use of a torch is not an option if energetic materials are suspected in the area.

4.1.10 Whenever working on piping or piping systems suspected of being contaminated with mercury, the Health & Safety (H&S) Technician shall monitor for mercury vapors whenever there is a potential for personnel exposure (e.g., when checking newly uncovered pipe runs; when making new pipe breaks; and/or releasing equipment, materials or areas).

4.1.11 Whenever working on piping or piping systems suspected of containing or containing large amounts of mercury, contact the ES&H Team Industrial Hygienist for task-specific instructions. The following precautions are recommended:

a. Whenever possible, place a catch basin made of smooth impervious materials (such as plastic or smooth-finish paint), large enough to contain the greatest amount of mercury that could spill and have sufficient dimensions to catch mercury droplets escaping from any plausible direction.

b. Felt mats or horsehair mats can be put on seamless plastic sheets laid in catch pans to catch the droplets from mercury spills. The droplets can then be collected by simply wrapping up the plastic with the mat still inside and disposing of it as mercury waste.

c. Stage the mercury HEPA filtered vacuum cleaner and mercury spill kit for quick deployment to the pipe separation area.

d. Avoid heating pipes that may contain mercury. If torch cutting or similar operations are required, contact the ES&H Team Industrial Hygienist for a task-specific hazard analysis.

NOTE: Use of a torch is not an option if energetic materials are suspected in the area.

e. Avoid walking on or touching surfaces contaminated with mercury.

f. If a mercury spill can not be cleaned up immediately, establish an exclusion area and post it with CAUTION signs stating, "Mercury Spill Area-Keep Out.

4.2 Sewage

The primary hazard involved in working on sewage pipes and related components are exposure to raw sewage. The potential for exposure to disease is the primary health risk, which must be controlled. The potential consequences, if workers are exposed, range from very short periods of discomfort to long-term illness.

A second less likely hazard involves exposure of the general population to disease as a result of cross-contamination if contaminated tools and equipment is utilized when working on the potable water systems. If pumps, hoses, or other equipment are not properly labeled or cleaned, and are utilized on potable water systems, the general Laboratory population could be exposed to the same disease as workers.

The following controls will reduce the risk of sewage hazards:

4.2.1 Individuals entering sanitary sewers, manholes, modifying sanitary sewer piping systems, cutting and capping sanitary sewer piping systems and/or disassembling sanitary sewer piping systems where raw sewage is present, shall wear the appropriate PPE as determined by the Industrial Hygienist.

Typical wet work PPE includes: knee-high rubber boots, elbow-length rubber gloves, Poly-Tyvek coveralls, and safety glasses with side shields/goggles that comfortably fit beneath closed face shield. Typical dry work PPE includes: safety shoes, surgeon's gloves, laboratory issue work coveralls (or equivalent garment), and safety glasses with side shields.

4.2.2 When work is completed, all equipment and hand tools used shall be completely disinfected by use of domestic water and commercial disinfectant. A 10 percent solution of household bleach (i.e., 9 parts water, 1 part house bleach) is acceptable. Tyvek suits shall be disposed of as routine waste unless radiation or hazardous materials are encountered. In this instance, the EA shall determine appropriate disposal. Boots, gloves, and respirators (if used) shall be cleaned with disinfectant.

Rinseate generated for disinfecting equipment will be collected for proper characterization and disposal.

4.2.3 Personnel working where raw sewage is present shall be free of any open wounds.

4.2.4 Personnel shall wash their hands immediately after completion of any work involving raw sewage and avoid any hand to mouth contact during these activities.

4.2.5 In order to prevent cross-contamination between the sanitary sewer system and the potable water system, all tools, hoses, pumps, and equipment utilized for work on the sanitary sewer system shall be labeled for "Sanitary Sewer Work Only" and stored in a separate location from similar equipment utilized for potable water system work.

4.3 Controls (Procedural)

CAUTION: Buried trap lines & elbows present the greatest potential for buildup of material in below grade pipe.

4.3.1 Prior to the removal of sewer lines, an evaluation will be made to determine on a case-by-case basis which method to use in excavating the lines. The two choices of method are: 1) remove pipes first and concrete second or 2) remove concrete first and pipes second.

4.3.2 The decision basis to determine the sequence of removal will take into consideration the following:

- Type of buried pipe system
- Diameter of the pipe
- Known/anticipated hazards
- Depth of pipe
- Number of floor drains, number of traps, and location

4.3.3 Mark/label the floor on each side of the pipes with the actual distance determined by the pipe diameter. The minimum distance will be 12 inches from center.

4.3.4 Ensure that the building tracing and underground locations are correct.

4.3.5 Clear all dirt and sand from the immediate area of the pipe such that it is completely visible. Observe the ground surrounding the pipe for discoloration, unusual smells, liquids or unnatural sediments. Inspect the pipe for any obvious damage and survey its length for radiological and hazardous material contamination as directed by the appropriate ES&H discipline.

All trenching and excavations shall be done in accordance with Document 12.1, "Access Control, Safety Signs, and Alarm Systems" (see Section 11.06: "Barricades and Barriers") of the *ES&H Manual.*

CAUTION: If unanticipated discoloration, unusual smells, liquids, unnatural sediments, or radioactive or mercury contamination are identified, STOP work on the piping and immediately call the appropriate ES&H team discipline. The discipline shall review the situation and recommend additional controls and/or PPE (if necessary).

4.3.6 Remove dirt and sand under the pipe to be extracted. Place plastic sheeting under the pipe section to be excavated such that it will collect any residue that may be inside the pipe at the point of separation. Apply dunnage to the underside of the pipe to prevent it from prematurely separating. The H&S Technician shall survey and inspect the pipe separation area so that cuts are made in areas of minimal radioactive/hazardous material content.

CAUTION: Be prepared for pipe breakage or inadvertent pipe separation due to failure caused by old age or the pipe's inability to support its own weight.

4.3.7 Place the pipe cutter around the pipe and tighten as much as possible without cutting. If using a hand-held pipe cutter, set the cutter over the point of separation. **DO NOT** initiate the cut until step 4.2.8 is complete.

4.3.8 Place an appropriate plastic protective shield over the cutter at the point of separation to minimize aerosol dispersion as directed by the appropriate ES&H Team discipline.

4.3.9 Actuate the pump on the cutter until the pipe is separated. If using a hand-held cutter, start cutter rotation until the pipe is separated.

NOTE: Potentially contaminated pipe (e.g. retention tank lines, buried trap lines, and sewer lines) should be cut into sections small enough to fit into hazardous waste containers in the event analysis deems them as hazardous/radioactive waste.

CAUTION: (1) Be watchful for signs of white or yellow crystals that are indicative of explosive materials. If observed, **STOP** work immediately and call the Explosives Safety Engineer for a thorough evaluation. (2) Avoid heating pipes that may contain mercury.

4.3.10 Remove the plastic protective shield (or sheet plastic if using a hand-held cutter) and pipe cutter. Clean all potentially contaminated residues adhering to the protective shield and/or cutter with cloth or paper wipes.

4.3.11 The HWM Sampling Technician shall acquire pipe interior samples as necessary to adequately characterize the pipe being removed.

CAUTION: If explosive contamination is suspected, contact the Explosive Safety Engineer immediately. Do not continue with the operation until the material has been identified.

NOTE: The H&S Technician may perform characterization sampling for equipment having low potential for process contamination, per the EA discretion and instructions.

4.3.12 Collect any residue that may have been generated in the cutting process for proper characterization and disposal.

4.3.13 Pull the plastic sheeting around the pipe. Cover the cut end of potentially contaminated pipes with a plastic bag (or equivalent) and seal the pipe ends (gooseneck) with tape. The H&S Technician shall verify that no contamination is on the exterior plastic sleeve.

NOTE: If necessary, clean a small area of the pipe where the tape is to be used to make sure the tape will stick.

CAUTION: Only clean a portion of pipe that does not contain any external contaminants and can withstand the extra handling without breaking.

4.3.14 Move the wrapped pipe from the trench by hand or mechanical means to the designated lay-down area. If necessary, continue to size-reduce and characterize the pipe segments under the same applicable controlled conditions as stipulated above. The RHWM Technician must notify the H&S Technician prior to sampling or size-reducing any bagged piping.

4.3.15 All excavating, cutting, and containment equipment shall be visually inspected, surveyed and swiped by the H&S Technician for radioactive and suspected hazardous contamination prior to release from the work area.

4.3.16 All personnel shall perform a whole-body contamination survey prior to leaving the work area, as appropriate.

4.3.17 The pipe separation area shall be surveyed by the H&S Technician for radioactive and suspected hazardous contamination, as appropriate, prior to its release for uncontrolled access.

4.3.18 All personnel shall wash hands and face before lunch, breaks, or leaving work.

ATTACHMENT H-4

REMOVAL OF POTENTIALLY CONTAMINATED BOX-TYPE HEPA FILTERS

NOTE: This is the generic version of the SOP. This SOP should be reviewed and modified, as needed, for each specific project.

1.0 Reason For Issue

This SOP identifies the hazards and provides the necessary controls for the removal of potentially contaminated or contaminated box-type HEPA filters in facilities undergoing deactivation, decontamination, decommissioning, and demolition (D&D) activities. D&D activities for the removal of potentially contaminated or contaminated box-type HEPA filters are not currently covered by an active Facility Safety Plan (FSP) and are not explicitly controlled by other health and safety documentation.

2.0 Work to be Done

This safety procedure is limited to box-type HEPA filter removal efforts being performed by D&D personnel in buildings or facilities undergoing sanctioned D&D activities. HEPA filter removal efforts generally entail:

- Establishing a controlled work zone in the immediate area of the filter(s) to preclude the spread of contamination during the separation and removable process;
- Removal of the HEPA filter(s) from the host ventilation system and their preparation for disposal;
- Isolation of (e.g., blanking-off) the ventilation system ducts from where the filter(s) were removed to seal the system from the outside environs; and
- Restoration of the work area to the contaminant levels present prior to the filter removal operation (when necessary).

3.0 Scope of Work to be Done

The exact scope of work to be performed during HEPA filter removal activities shall be specified in the job-specific Integration Work Sheet and safety document.

4.0 Hazards Analysis & Controls

General hazards encountered during HEPA filter removal activities may include:

- Falling components, debris and/or flying objects;
- Littered and/or congested walking and working areas;
- Slips, trips, and falls;
- Cuts, bruises, & pinches;
- Potential confined spaces; and
- Heat stress

HEPA filters and their associated ducting and fan systems may be contaminated with hazardous and/or radioactive materials. Removal of such filters may involve the potential for worker exposure to:

- Entrained high explosives;
- Entrained alpha, beta and/or gamma emitting radioactive materials; and/or
- Other unspecified entrained toxic materials (e.g., inorganic or organic substances).

The potential loss of containment of loose radioactive contamination, residual explosive materials, and/or hazardous material inside filters and their associated ducting and piping systems could result in worker exposure or injury and environmental contamination from release of material to the room, area or environment.

The following controls will reduce the risk of the hazards:

4.1 Prior to the removal of any filter, an Integration Work Sheet (IWS) shall be completed for the specific ventilation system(s) and filter(s) involved.

4.1.1 The history of each ventilation system shall be reviewed by the D&D Responsible Individual and ES&H Team Disciplines during the IWS construction and review.

4.1.2 Further safety review, documentation, and control requirements, as necessary, will be specified by the ES&H Team Disciplines during their review of the IWS.

4.2 The EA shall be consulted for all waste sampling, characterization, and disposal guidelines to establish the necessary controls for waste disposition and oversee the waste disposition process.

4.2.1 Disposition of HEPA filters must meet "Acceptance Process for Waste HEPA Filters by HWM Personnel" document #97-009, Rev. 1 (see attached document). A "WASTE HEPA FILTER INFORMATION" form must also be completed prior to shipment to HWM (see attached form).

4.3 Based on the ventilation system history and current conditions, the ES&H Team Disciplines shall assign the level of contamination-specific control required (e.g., none, low-level, or high-level). Control levels may be summarized as:

- No Contamination involved. Process-specific contamination controls are not required. Remove filters utilizing standard industrial safety controls.
- Low-level or Potential Contamination. Each filter removal shall require the use of the contamination control procedure described in Section 4.9 of this SOP, "Filter Removal Techniques -- Low-level Contamination."
- High-level Contamination. Each filter removal shall require the use of the contamination control procedure specified in Section 4.9 of this SOP, "Filter Removal Techniques -- High-level Contamination."

4.4 The minimum PPE requirements described in Sections 4.9 and 4.10 shall be confirmed as adequate or augmented by the ES&H Team Disciplines in the job-specific safety documentation (IWS and/or associated hazard assessment and control document, etc.).

4.5 The following minimum equipment and materials are typically needed for HEPA filter removal tasks and should be readily available during removal activities:

- Plastic sheeting
- Plastic bags (adequate sizes as needed)
- Tape (2-3 inches wide)
- Indelible ink pens
- Caps to cover filter ends (can be made from sheet metal, plywood, etc.)
- Appropriately-sized end-caps to cover open ducting ends
- Wipes (for decontamination and/or surveys)
- At least two Micro R Meters, Blue Alpha Meters and E-120 meters with Pancake Probes, and other detection instrumentation as specified by the ES&H Team Health Physicist
- Mercury Sniffer
- Organic Vapor Meter
- Other appropriate survey instruments
- Glassine bags and swipe tabs (as needed)
- Contaminated waste receptacle(s) (segregated for RAD and NON-RAD)
- Appropriate radiation/contamination labels and postings as required
- CAM (as required by Health Physicist)
- Spare PPE (e.g., gloves, shoe covers, Tyvek and head covers)
- Small glass vials to collect evaluation samples should Explosive contamination be suspected.

4.6 A controlled work area shall be clearly established to prevent the migration of contaminants from the work site whenever removing potentially contaminated or contaminated HEPA filters.

4.7 There shall be no eating, drinking, smoking, chewing (gum or tobacco), or applying lip balm/cosmetics in the work area where the potentially contaminated or contaminated filter is being removed. Storage of such items in the work area is prohibited.

Procedural Controls

4.8 Filter Removal Controls -- No Contamination

4.8.1 If the IWS determines that there is no potential for radioactive or hazardous contamination, process-specific contamination controls are not required. The D&D team may proceed utilizing standard, approved industrial safety controls.

4.9 Filter Removal Controls -- Low-level Contamination

The following contamination controls shall be employed, per Hazards Control confirmation in the IWS/HA, for removing low-level contaminated filters. These controls may be upgraded by Hazards Control during removal operations as contamination conditions warrant.

4.9.1 At least two filter removal workers plus a H&S Technician are required for low-level contaminated filter removal.

If the contamination is radioactive, at least one of the filter removal workers shall be a qualified radiation worker.

4.9.2 Minimum PPE requirements (Low-level or Potential Contamination):

- Leather gloves over thin nitrile gloves
- Safety shoes or stout work boots
- Shoe covers
- Safety glasses with side shields (except while wearing a full-face respirator)
- Tyvek® over-garment (or approved alternative) or Laboratory issue coveralls
- Half-mask respirator minimum, full-face/PAPR respirator optional
- Skull cap
- Hard hat, if overhead work is anticipated

CAUTION: Removal of HEPA filters may take place on roofs or at heights requiring scaffolding.

The use of PPE may affect movement and awareness of the work environment. Extra care shall be taken to prevent falls.

Planning and Preparation Period

4.9.3 Filter removal workers shall:

- Be qualified to wear half-mask and full-face respirator.
- Stage/Acquire tools and materials as required.

- Place plastic sheeting on the floor as primary floor contamination control. (This should encompass as much of the work area as required.)
- Place an additional piece of the plastic sheeting or paper beneath the area of separation.
- Follow the controls delineated in this section, as confirmed or augmented in the job-specific safety documentation.

4.9.4 The H&S Technician shall

- Verify that a current IWS and appropriate safety documentation, as specified in the IWS, are on file or initiate the IWS/HA with the ES&H Team Disciplines.
- Verify that workers have valid respirator cards.
- Inform the workers of the nature/type of contaminant(s) that will be encountered in the filter removal.
- Describe the safety techniques and approach that will be used during removal process.
- Follow the controls specified in the IWS/HA for PPE.

Filter Removal (Box -Type ONLY)

4.9.5 The filter exhaust blower should be running to maintain a constant air-flow through the exhaust side of filter.

NOTE: If the exhaust blower can not be utilized, portable ventilation or a glove-bag shall be used. Such alternative controls shall be detailed in the IWS and/or associated HA.

4.9.6 Worker #2 stands by with end cap/cover and tape.

4.9.7 Worker #1 removes the seismic restraints and the tape/clamps from the filter inlet side.

4.9.8 Worker #1 gently rotates and breaks loose the airtron/boot on the filter inlet side (prying with a screwdriver is sometimes needed). Do not remove airtron boot at this time.

4.9.9 Worker #2 moves into the area ready to cover the inlet side of filter.

4.9.10 Worker #1 will slowly break the airtron/boot from the inlet side, leaving a small gap between the boot and inlet. At this time, the H&S Technician and/or HWM Sampling Technician shall survey and swipe the inside of the filter inlet plenum for safety and characterization purposes, per ES&H Discipline instructions.

4.9.11 Worker #2 places end-cap/cover on the filter inlet side and tapes it in position.

4.9.12 Worker #2 can then place a plastic bag temporarily over airtron and secure the bag to prevent any movement. The ducting end-cap can now be checked for proper fit. If properly fitted, permanently install the ducting, hot-side end- cap.

4.9.13 The H&S Technician shall perform personnel and area surveys for radioactivity (if required) and shall survey and/or visually check for other contaminants.

4.9.14 Repeat steps 4.9.8 through 4.9.13 for the filter outlet side.

CAUTION: Assume that the filter outlet is contaminated.

4.9.15 The H&S Technician shall survey the filter exterior and surrounding floor area for radioactivity and/or suspected toxic material(s).

4.9.16 Once the survey is complete, the filter should be bagged out of the area and appropriately packaged and labeled as waste by the HWM team.

Post Removal Clean Up

4.9.17 The H&S Technician shall survey all items and personnel leaving the control zone for radioactive and hazardous contamination, as appropriate.

4.9.18 With H&S Technician coverage, Workers #1 and #2 shall roll the plastic sheet inward to prevent dispersal of potential contaminants and place in a bag for disposal.

4.9.19 The work area shall be surveyed by the Health & Safety Technician(s) for radioactive and other suspected hazardous contamination, as appropriate, prior to release for uncontrolled access.

4.9.20 All wastes shall be collected and disposed of in the manner stipulated by the EA.

4.9.21 The filter shall be marked for disposal with the known and potential contaminant type(s) and approximate levels (as determined from process knowledge and direct sampling/surveying information).

4.9.22 The contaminated filter shall be prepared for interim storage by the Hazardous Waste Management team.

4.9.23 Should Explosive Contamination be suspected, samples shall be collected in the glass vials per instructions from the Explosives Safety Engineer.

NOTE: All HEPA filters that are potentially contaminated with fissile material must be sent to Material Management for counting to determine the amount of fissile material contained in the filter.

4.10 Filter Removal Techniques - High-Level Contamination

The following contamination controls shall be employed for removing high-level contaminated filters:

4.10.1 When highly contaminated with radioactive materials, at least two Radiation Workers and one H&S Technician are required for a filter removal. If highly contaminated with other toxic materials (e.g., Be), all involved workers shall be thoroughly trained of the hazards and controls associated with the known contaminant(s).

4.10.2 Minimum PPE Requirements (High-Level Contamination):

- Leather gloves over thin nitrile gloves
- Safety shoes or stout work boots
- Shoe covers
- Two sets of protective clothing (e.g., double Tyvek®, Tyvek® over cotton protective garment)
- Full-face respirator
- Hood
- Hard hat if overhead work is anticipated.

CAUTION: Removal of HEPA filters may take place on roofs or at height requiring scaffolding. The use of PPE may affect movement and awareness of the work environment. Extra care shall be taken to prevent falls.

Planning and Preparation Period

4.10.3 The ES&H Team disciplines shall determine the safety technique and approach that is used for the removal operation. The bag-out method is preferred for changing highly-contaminated filters.

4.10.4 If the filter to be removed is in an area where the ventilation system is not at least double HEPA-filtered before exhausting to the atmosphere, a tent enclosure is required. The tent atmosphere shall be maintained at a minimum of -0.02 column inches of water pressure differential at all times, relative to the outside pressure, and monitored for airborne contamination. The tent shall be provided with HEPA-filtered exhaust ventilation. If the area does have a ventilation system that is at least double HEPA-filtered before exhausting to the atmosphere, the area/room must be at negative pressure relative to the corridor.

4.10.5 Filter removal workers shall:

- Be qualified to wear half-mask and full-face respirator
- Stage/Acquire tools and materials as required.

- Place and secure plastic sheeting on the floor as primary floor contamination control. (This should encompass as much of the work area as required.)
- Place and secure an additional piece of the plastic sheeting or paper beneath the area of separation.
- Follow all controls delineated in this SOP, as confirmed or augmented in the job-specific safety documentation.

4.10.6 The H&S Technician shall:

- Verify that a current IWS and appropriate safety documentation, as specified in the IWS, are on file or initiate the IWS/HA with the ES&H Team Disciplines.
- Verify that workers have valid respirator cards.
- Inform the workers of the nature/type of contaminant(s) that may be encountered during the filter removal.
- Describe the safety techniques and approach that will be used during removal process.
- Follow the controls specified in the IWS/HA for PPE.
- Verify proper CAM operation (if required, per IWS/HA) immediately prior to the start of work.
- Verify that the room is at negative pressure relative to the corridor immediately prior to the start of work. If a tent enclosure is required, verify a minimum of -0.02 column inches of water pressure differential within the tent, relative to the outside pressure, immediately prior to the start of work.
- Verify that at least two of each type of required radiation meter is available in the immediate work area.

Filter Removal (Box -Type ONLY) Bag-Out method

4.10.7 The filter exhaust blower shall be running to maintain a constant negative pressure on the exhaust side of the filter.

4.10.8 Remove the seismic restraints and the tape/clamps from filter inlet duct. Set up bag-out bag.

4.10.9 Carefully move filter to separate the inlet port from the contaminated ducting. The bag should unfold to maintain a contamination barrier.

CAUTION: Excessive air flow can cause the contamination barrier bag to be ingested into the filter housing or otherwise damaged. Ensure that the bag is adequately secured.

4.10.10 When about 30-60 cm of bag is unfolded, tightly wrap a 10-15 cm section between the duct and filter inlet with 2-inch vinyl tape.

4.10.11 Using a single-edge razor blade, cut through the center of the wrapped portion of the bag.

4.10.12 Use 2-inch vinyl tape to cover the cut ends of the wrapped bag.

4.10.13 Worker #1 gently inserts the exposed end of the bag into the inside of the duct on the hot side. The ducting end-cap can now be checked for proper fit. If properly fitted, permanently install the ducting, hot-side end-cap.

4.10.14 Worker #2 gently inserts the exposed end of the bag into the inside of the filter on the inlet side. When inserted, Worker #2 shall then place the end-cap/cover on the filter inlet side.

4.10.15 The H&S Technician shall perform personnel and area surveys for radioactivity (if required) and shall survey and/or visually check for other contaminants.

4.10.16 Repeat steps 4.9.8 through 4.9.13 for the filter outlet (cold side) if a contamination barrier bag was installed.

CAUTION: Assume that the filter outlet is contaminated.
If the filter outlet (cold side) is not furnished with a contamination barrier bag, perform the following:

1. Worker #1 removes tape/clamps from the filter outlet side.
2. Worker #1 gently rotates and breaks loose the airtron/boot on the filter outlet side (prying with a screwdriver is sometimes needed). Do not remove airtron boot at this time.
3. Worker #2 moves into the area ready to cover the outlet side of the filter.
4. Worker #1 will slowly back off airtron/boot on the outlet side. Do not travel any farther than required to insert the end-cap/cover by worker #2 onto the filter. At this time, the H&S Technician shall survey and swipe the inside of the filter outlet plenum for safety and characterization purposes.
5. Worker #2 places end-cap/cover on the filter outlet side and tapes it in position.
6. Worker #2 can then check the ducting end-cap for proper fit. If properly fitted, permanently install the ducting, cold-side end-cap.

CAUTION: If the exhaust fan is drawing from only this one plenum filter assembly and there is no further practical need to maintain an in-duct cold-side negative pressure, shut down the fan as soon as practical to preclude it from over-heating and burning-out.

4.10.17 The H&S Technician shall survey for radioactivity and/or suspected toxic material(s) on the floor and filter.

4.10.18 Relocate the filter to a nearby area and enclose it in a second plastic bag or other sealed plastic barrier. The filter must then be appropriately packaged as waste by the D&D RHWM team.

Post Removal Clean Up

4.10.19 The H&S Technician shall survey all items and personnel leaving the control zone for radioactive and hazardous contamination, as appropriate.

4.10.20 With H&S Technician coverage, Workers #1 and #2 shall roll the plastic sheet inward to prevent dispersal of any contaminant that might be there and place in a bag for disposal.

4.10.21 The work area shall be surveyed by the Health & Safety Technicians for radioactive and other suspected hazardous contamination, as appropriate, prior to release for uncontrolled access.

4.10.22 All wastes shall be collected and disposed of in the appropriate manner as stipulated by the EA.

4.10.23 The filter shall be marked for disposal with the known and potential contaminant type(s) and approximate levels (as determined from process knowledge and direct sampling/survey information).

4.10.24 The contaminated filter shall be prepared for interim storage by the Hazardous Waste Management team.

4.10.25 Should Explosive Contamination be suspected, samples shall be collected in the glass vials per instructions from the Explosives Safety Engineer.

NOTE: All HEPA filters that are potentially contaminated with fissile material must be sent to Material Management for counting to determine the amount of fissile material contained in the filter.

5.0 Bibliography

Standard of Fire Protection for Laboratories Using Chemicals, National Fire Protection Association (NFPA) 45, Current Edition.

Standard for Exhaust Systems for Air Conveying of Materials, National Fire Protection Association, (NFPA-91), Current Edition.

ATTACHMENT H-5

EXAMPLE SOP
Dismantling and Removal of a Ventilation System Contaminated or Potentially Contaminated With Perchlorates

NOTES: 1) This SOP is an example and can be used as a template. This procedure will be developed for a specific project as needed; therefore any references to documents, organizations, or personnel should be disregarded. 2) This example SOP has been tailored to address the hazards, controls and methodologies specific to this project. Additional hazardous material may be encountered on a case-by-case basis in conjunction with perchlorics (i.e., radiological contamination). Controls for other hazardous materials will be specified in the HAC.

1.0 Reason for Issue

Seven of the Twenty Two B-412 ventilation systems may be contaminated with perchlorates, which are potentially explosive, and may detonate if handled incorrectly during ventilation system disassembly. Procedures for disassembly and decontamination of perchlorate-contaminated ventilation systems as well as the associated hazards and controls are not described in the LLNL Health and Safety Manual.

2.0 Scope of Work

This scope involves electrical and mechanical disconnect, sampling, testing, verification, component disassembly, system dismantlement, and decontamination of contaminated ducting, fans, and equipment associated with laboratory ventilation systems.

Work actions may be directed at disassembly of contaminated systems or components for the purpose of maintenance, or dismantlement, decontamination, and disposal. The following systems will be dismantled and removed in the following order:

FHE-4 located in room 1005 zone #4 (FHE-4)

FHE-5 located in room 1107 zone #4 (FHE-5)

FHE-6 located in room 1110 zone #4 (FHE-6)

FHE-7 located in room 1116 zone #4 (FHE-7)

FHE-8 located in room 1111 zone #4 (FHE-8)

HDCH-1 located in room 1237 zone #3 (FGBE-1000)

HDCH-2 located in room 1237 zone #3 (FGBE-1000)

3.0 Hazards of Perchlorates

Perchlorate residues are shock sensitive, and could explode or initiate a fire if subjected to mechanical shock, excessive heat, electrical discharge or other initiating event. Perchlorate residues are strongly reactive with organic materials requiring the use of inorganic tools, equipment and PPE.

In the event that the controls set forth are not properly implemented, a worst case-propagating explosion could potentially release significant amounts of energy, and could severely injure or kill workers in the immediate vicinity. Using water to dissolve the perchlorate salts and crystals into non-explosive and non-flammable compounds in water mitigates perchlorate hazards. These procedures render perchlorate residues insensitive making the worst-case event non-credible.

Perchlorates possess varying, but in general, fairly low toxicity. Skin or eye exposure may cause irritation. Inhalation of high concentrations may cause irritation, metallic taste, digestive disorders, chest pain or difficulty breathing. Ingestion of perchlorates may cause acute effects such as metallic taste, vomiting, digestive disorders, headache, bluish skin color, kidney damage, paralysis, convulsions, and/or coma. There is no specific occupational exposure limit for perchlorates (although there are limits for various metal perchlorates based on the metal content rather than the perchlorate).

Perchloric D&D work requires the use of intensive PPE, which will include ballistic body armor, helmets, and face shields. The use of this PPE introduces additional industrial hazards to workers due to narrow fields of vision and heat loading due to wearing heavy protective clothing.

4.0 Project Planning

How to Utilize this Document:

During the planning phase, the RI is required to tailor this SOP specifically for the task to be completed. Approval from Team 2 and the SOP RI is required before implementing the modified SOP.

The RI will also reveal which fume hoods fall under a Level One as well as a Level Two project.

Tailoring of this document would consist of providing additional detail in the appropriate sections.

Title: Define the project by building number.

Section 1.0: No details required.

Section 2.0: Identify specifically which systems will be removed i.e., FHE system, vacuum lines, drain lines, etc.

Section 3.0: No details required.

Section 4.0: No details required.

Section 5.0: Identify R&R's, by name, for each individual participating in the task.

Section 6.0: Identify specifically the PPE required for a Level Two project. Identify the approval of the PPE by stating who approved and on what date.

Section 7.0: No details required.

Section 8.0: Identify which buildings/area will be notified as well as the name of the POC for that building/area.

Section 9.0: No details required.

Section10.0: No details required.

Section 10.1: Identify specifically the FHE or HDCH # and the Level it falls under, room#, cut locations for each hood, sampling requirements and any integrity issues.

Section 11.0: No details required.

Section 12.0: No details required.

Section 13.0: Identify the specific PPE requirements.

Section 15.0: No details required.

Section 16.0: No details required.

Section 17.0: No details required.

There are two methods used by SAT to detect the presence of perchlorates, methlyne blue screening and ion specific electrode testing.

Methlyne blue screening is used as an initial characterization for the potential presence of perchlorates. The results of the methlyne blue screening can produce a false positive; Therefore, the ion specific electrode testing method is used (based on the Industrial Hygienists recommendation) to confirm the results of the methlyne blue screening test.

Two different levels of perchloric tasks may be encountered during D&D work. The following describes the two levels:

- **Level One:** A system having potential detonable levels of perchlorate salts.
- **Level Two:** A system having residual non-detonable perchlorate salts.

Since each fume hood/ exhaust system is different, each ERD perchloric D&D project shall be uniquely designed and tailored to the specific field conditions involved. In addition to the perchloric hazards, a review of all other potential hazards and their sampling results shall be conducted (ex. Radiological, IH metals, Beryllium, etc.).

A dismantlement plan is required for both the Level One and Level Two perchloric D&D project types. The plan includes a drawing showing the entire mechanical system, inlet to exhaust, and will be used as the basis for determining cut and separation locations, start and end points. During the planning phase of a Level One or Level Two project, the system shall be inspected to determine the best method to stabilize potential dried salts using water mist injection or other processes. Attention must be given to determine if low points in the system are at risk of breaking due to the added weight of water. Where this is a factor, inner tubes pressurized with air can be placed to provide support to the ducting.

When defining the disassembly plan, it is important to consider the size and weight of the components being removed. The following restricts the size of the components being removed:

- The ability to safely support, lift, and bag after separation
- Placement into a 55 gallon bag
- Full submergence into the selected decontamination bath

Duct dismantlement will be conducted using hand or battery-powered saws. When designing the dismantlement plan, it is critical to note all exposed flanges, gaskets, rusted or corroded bolts, or fitted connections. For a Level Two project, these areas are to be isolated by cutting the ducting to remove them intact.

Each Level One and Level Two dismantlement plan shall specify the starting location, including the tools and methods to obtain the initial entry or hot break.

Other factors:

a. A review of all duct run locations including vertical transitions through rooms shall be evaluated to determine the following:

b. Probability/ risk of collateral damage due to sympathetic detonations

c. Water damage due to roof leaks from roof decontamination work

d. Protection of programmatic materials from a potential explosion or fire.

e. Securing and purging of flammable gas systems associated with the contaminated ventilation system.

f. The encountering of other room specific hazards as part of the dismantlement work

g. Removal of materials stored in associated hoods prior to the start of work

h. Prior duct sample analysis

i. Fume hood drain end point locations

j. Evaluation of the integrity of the system to determine if the added weight of water will fracture or break the duct system.

k. Stagnant air issue

l. Pests/vermin/hanta virus concerns

m. Proper lighting

n. Slips/trips/falls from water spray

o. Workers risk to falling through ceiling

For a Level One and Level Two project, the system shall be spray painted identifying the location and angle where cuts shall be made during dismantlement, prior to the start of work.

A mock up dry run spanning walk through, full dress rehearsals will be conducted at the work site to ensure all team members are comfortable performing their assigned tasks in the required PPE under current field conditions. The mock up shall include equipment and PPE review.

5.0 Team Roles

- Oversight: (H&S Tech)
- Wash: (Laborer or H&S tech)
- Vacuum excess water: (Laborer, H&S tech or RHWM)
- Cutter: (Laborer)
- Support equipment: (Laborer or H&S tech)
- Surveys: (H&S Tech)
- Swipes: (H&S Tech)
- Viewing for crystals/stains: (H&S Tech)
- Tapping: (Laborer or H&S tech)
- Bagging: (Laborer or H&S tech)
- Staging: (Laborer)
- Equipment Transfers: (Laborer or H&S tech)
- Collect excess water from fume hood location: (RHWM)
- Transfer collection drum to next fume hood: (RHWM)

Note: Specific individuals will be assigned roles during the mock up dry run. Training will occur for performing different operations during the removal process, which will incorporate individuals changing positions. The changes will only occur the next day. Assigned personnel will remain on their assigned task for the entire day.

Note: The individual making the cuts will also tape the ends. The individual bagging will tape the bag at the top. Power tools <u>will not</u> be handed off to another individual. The tool will be layed down and the operator will pick the tool up. This will eliminate the possibility of engaging to tool while handing it off.

6.0 Personnel Protective Equipment

<u>Level One Project</u>

Team members working in the restricted zone will wear ballistic-rated flack vests, ballistic rated helmets with faceshields, slip resistant safety shoes, PVC coated tyvek coveralls and mid-weight natural rubber, nitrile, or neoprene gloves.

The associated HAC will identify the above-mentioned equipment as well as additional PPE requirements.

Workers shall perform PPE cross checks to assure proper fit and coverage.

Level Two Project

The level of PPE will be determined by the ES&H Team with concurrence from the Project RI and other appropriate personnel as necessary, i.e., the D&D Team Leader. The associated workers shall perform PPE cross checks to assure proper fit and coverage.

7.0 Training and Required Reading

All personnel engaged in D&D perchlorate ductwork shall have completed the following required and documented training prior to start of work:

- SOP qualification
- Perchloric qualification or follow the qualification card process
- Attend the pre-start
- Provide input to the SOP and checklist
- HAC review
- Job specific perchloric acid hazards communication training that addresses both the hazards associated with perchlorate residue and system D&D requirements.
- A pre-job walk through of the project area is a base requirement for perchloric projects. A full dress rehearsal mock up and dry run is required prior to the start of an activity.

8.0 Notifications

Building/area personnel shall be notified that the affected building area will be closed to all personnel not involved with this work. This shall be accomplished by the following means:

- Signs posted at entry doors

Based on the job specific probability of risk, additional notifications may be required for these activities. Other notifications may include Plant Engineering shift Foremen, LLNL Fire department, off-shift Hazards Control Technician, LLNL Laboratory Emergency Duty Officer (LEDO), and Facility managers of the adjacent buildings.

The P.M. (Matt Robison) will notify the surrounding FPOC's for buildings 411 (Dave Wetherall 3-5520 Pager 02124) and 418 (Dave Lavinsky 3-6538 Pager 00956) as well as the Fire Department (2-5194). Additional notifications are not required due to the low probability of perchlorate salts being present. If detonable levels are identified, all above-mentioned personnel will be contacted prior to continuing work.

9.0 Access Controls

All Level One D&D perchloric projects shall establish two specific access areas for each project.

Regulated Area: The Regulated Area establishes a boundary to keep non-project personnel away from the immediate work area, and is established on risk, quantity distance, and local field conditions.

A decontamination work area will be established within the Regulated Work area. This area is where water immersion is to be utilized for cleaning perchlorate contaminated ductwork and equipment.

Under no conditions can tools or equipment be brought into the Regulated Work area without prior review and approval of the project IH or Responsible Individual.

Restricted Area: The Restricted Area is the immediate location where the work is performed and will include adequate space for initial wash down, tools/ supply staging, and component lay down.

Unauthorized personnel will not be allowed in the Regulated or Restricted area during operations.

If unauthorized persons enter these areas during operations, work will be stopped until unauthorized personnel depart.

Boundaries to the Regulated Area will be established using ropes, tapes and signs indicating the following or equivalent.

Danger

Do Not Enter

Perchloric Acid Hood Dismantling

The methods for restricting access may vary, however the Restricted Work Area shall not be cordoned off due to the potential for the introduction of additional tripping hazards.

Only employees wearing ballistic gear and directly involved with the disassembly will be allowed within 75 feet of the contaminated ducting during the disassembly phase of a Level One project. One or more support persons are allowed within the 75-foot radius, wearing the lightweight flak vests, hardhat and a regular face shield. These support personnel may not approach within 75 feet of the ducting when decontamination or removal work is ongoing.

All ERD Level Two perchloric D&D projects shall establish one specific access area for each project.

Restricted Area: The Restricted Area is the immediate location where the work is performed and will include adequate space for initial wash down, tools/ supply staging, and component lay down.

Unauthorized personnel will not be allowed in the Restricted Area during operations.

If unauthorized persons enter this area during operations, work will be stopped until unauthorized personnel depart.

Boundaries to the Restricted Area will be established using ropes, tapes and signs indicating the following or equivalent.

Only employees wearing ballistic gear (as defined by Management described in Section 6.0 "PPE") and directly involved with the disassembly will be allowed within the Restricted Area during the disassembly phase of a Level Two project.

A key map will be utilized outlining the regulated area boundary as well as identifying the room where the fume hood resides.

10.0 Methodology

For a Level One and Level Two project, the system shall be spray painted identifying the location and angle where cuts shall be made during dismantlement, prior to the start of work.

Using a graded approach for a Level One or Level Two project, mock up dry runs spanning walk through up to full dress rehearsals shall be conducted near the work site to ensure all team members are comfortable performing their assigned tasks in the required PPE under current field conditions. The mock up shall include equipment and PPE review.

Perchloric contaminated system dismantlement should begin at a location where visual interior inspection can be easily obtained with the least physical impact and shock to the system. Contrary to other SAT contaminated HVAC system dismantlements; it is preferable to work from the blower, or end point, back to the fume hood. This method will generally allow the team to obtain visual and physical access by safe removal of the blower.

Field sampling for perchlorates using methylene blue is required during the disassembly process. Near field sampling using a Selective Ion Chromatography detector shall be used to determine the constituents of rinse water for release.

If the age of the systems, or the integrity of the ducting is suspected of being fragile and at risk of failure with the added weight of water being added during misting, additional supports must be included during planning. Additional supports may include placement of inner-tubes pressurized with air, or alternate acceptable dunnage outside the duct.

A funnel/drum system will be constructed at the fume hood allowing excess water to be captured and treated.

Since perchloric salts dissolve in water, the duct system shall be partially neutralized prior to the start of activities using a method defined and approved during the project planning process. Several options can be selected depending on the configuration, drain connections, and system location.

- For single exhaust systems venting vertical without lateral transitions, direct water wash down of the duct interior may be adequate.
- For single or manifold exhaust systems containing lateral duct runs or transitions, water mist injection propelled through the ducting by facility positive pressure air (?) can be utilized.

Perchloric D&D projects are very water intensive, which creates additional hazards to both the workers and to the facility. The work area must be contained to collect rinse water to minimize

cross contamination, slip hazards, and water leaks into the building. Use of buckets and 10 mil plastic sheets, or other approved methods needs to be addressed in the planning.

Tools used for disassembly shall be inorganic, preferably bronze tools. All equipment used in the project will be reviewed by the IH prior to use to ensure inorganic materials are utilized.

As duct pieces are exposed, team members shall continually view the interior of the system, inspecting for crystallized salts or other debris. After performing the duct interior inspection, one team member will wash the duct interior and exterior applying liberal amounts of water to ensure neutralization.

For a Level One project, as pieces are removed, the edges will be taped, they will be sprayed with water to keep the interior moist, sealed in plastic bags, and set aside in the localized staging area for later transport to the decontamination work area for the last phase of the decon project. The ends of the duct will be taped to prevent puncture to the bag. The lead person shall assess the work area for readiness (excess water, equipment and tools, PPE, etc.) before beginning each cut.

When further dismantlement will not be performed, a long non-sparking extension rod, (PVC, brass, etc.) bent midway to a 30° angle and fitted with sponges (after wetting) will be used to scrub the inside duct surfaces. The rod will also be used to obtain methlyene blue screening only when the entire system can be viewed and confirmed no crystals are present.

10.1 Duct Disassembly

FHE-4 located in room 1005 zone #4 (FHE-4)

FHE-5 located in room 1107 zone #4 (FHE-5)

FHE-6 located in room 1110 zone #4 (FHE-6)

FHE-7 located in room 1116 zone #4 (FHE-7)

FHE-8 located in room 1111 zone #4 (FHE-8)

HDCH-1 located in room 1237 zone #3 (FGBE-1000)

HDCH-2 located in room 1237 zone #3 (FGBE-1000)

Note: Cut points have been identified in the specific systems checklist photos.

(These steps must be executed sequentially)

<u>Level One Project</u>

Verify that the area is set up properly for a safe operation (lighting, herculite, all tools and equipment are ready for use, PPE, etc.)

Ensure all personnel have donned the appropriate PPE as stated in the associated HAC, make initial cut/break (using non-sparking tools) on the top-side of the boot/duct located near the blower. Make the cut large enough to allow a visual inspection, via a bore scope, for salt crystals.

a. Starting at the open boot/duct end located in the attic, the interior and exterior of the duct will be wetted using spray bottles or "Hudson" type sprayers. After wetting, a

wet sponge will be used to reach as far as possible into the open duct and wash all visible material clear of the first cut point and then thoroughly wash clean the inside of the duct past the point where sawing is planned. This goal is to wet the ducting past where sawing will occur to maintain a safety margin for workers starting on the next duct piece that will be exposed. A typical section would be 3 to 5 feet. After washing clean, the area will again be sprayed to wet the interior duct. The determination on "how clean is clean" can be made using visual, methylene blue tests, or ion specific electrode testing. We will be using visual and methlyne blue testing.

b. Before the duct is cut, the interior will be thoroughly inspected for crystal or "frosted" material and rad surveys will be conducted. In the event crystals are observed, a "Stop Work" will be enforced, the area cordoned off and the RI and IH must be notified to assess the situation.

c. As each section of duct is removed, surveys and swipes will be obtained, the ends will be taped and the section will be bagged and transferred to the localized staging area.

d. The lead individual will assess the work area for readiness prior to the next cut.

e. All gasketed flanges will be soaked in for 24 hrs. The water troughs will be located in the decontamination area.

f. The remaining sections will be transferred to either the WAA or project staging area based on survey results.

Level Two Project

a. Ensure all personnel have donned the appropriate PPE as stated in the associated HAC.

b. Ensure the area is set up prior to initiating work (Herculite, tolls, PPE, equipment, etc.)

c. Begin removing the system starting at the fume hood and working towards the last cut point during the Level One activity. Always be looking ahead for crystals as a precautionary step.

d. Perform swipes and surveys on each section prior to bagging.

e. Transfer sections to the localized staging area.

f. Once the entire system has been dismantled and removed, transfer the sections to either the WAA or project staging area based on survey results.

11.0 Fan Removal Precautions

Level One Project

All work on fans will be performed after electrical Lock Out/Tag Out has been completed. Workers shall ensure that the blades of the fan will not turn or free wheel during work activity.

Pre-wet the interior of the fan prior to the work by spraying water into the inlet and manually turning the fan shaft. Accumulated water shall be drained and tested.

When the inlet ducting has been removed and the interior of the fan has been made accessible, it will be sprayed down with water and scrubbed with sponges. The rinsate will be checked and when it no longer produces a color change in methylene blue, the interior cleaning is complete.

Exterior nuts, bolts and assemblies that are not contaminated can be removed with non-sparking tools while being misted with water.

Assemblies that may be contaminated with perchlorates such as fan gaskets, bolts, flanges will be moved to the decontamination area for disassembly after immersion into water for at least 24 hours.

12.0 Transporting Ductwork and Equipment to the Regulated Area for Decontamination

Level One Project

The wet portions of the ducting and equipment will be sealed in double plastic bags and safely transported to the Regulated Area in support of decontamination.

13.0 Decontamination and Final Disassembly

Level One Project

The final decontamination of the ductwork will occur in the established perchlorate Regulated Area.

During final decontamination, workers will wear flack vests, rubber, nitrile or neoprene gloves, safety glasses, and a face shield as minimum requirements. Additional PPE requirements will be identified by the ES&H Team with concurrence from the Project RI and other appropriate personnel as necessary, i.e., the D&D Team Leader on an as needed basis.

Sections of sealed ductwork will be placed in a fully immersing water bath in the Regulated Area, the plastic opened to allow water to enter and scrubbed until they are free of perchlorates as demonstrated by the methylene blue field test. Alternatively, ion selective chromatography can be used to verify methlyne blue results.

Sections of ducting with joints shall be soaked for at least 24 hours before any bolts are removed and any joints are opened under water.

For pieces that are too large for total submersion, plastic wrapping or other means shall be employed to create a field expedient bath.

14.0 Emergency Response Plans and Procedures

The Emergency Management Department of Facilities & Infrastructure shall be briefed on the hazards associated with this work at least one day prior to the start of duct disassembly.

In the event of fire, workers will evacuate their area and notify LLNL Emergency Management (911 from a landline or 447-6880 form a cell phone).

15.0 Maintenance, Inspections, and Quality Assurance

All PPE shall be checked, by the workers, immediately prior to its use, and confirmed to be correct, operable, and in good serviceable condition.

For a Level One project, during the ventilation system disassembly phase, a safety observer shall be stationed in the regulated work area. The observer shall be in constant visual contact and capable of communicating with the workers and support personnel.

16.0 Bibliography

Standard of Fire Protection for Laboratories Using Chemicals, National Fire Protection Association (NFPA) 45, Current Edition.

Standard for Exhaust Systems for Air Conveying of Materials, National Fire Protection Association (NFPA-91), Current Edition.

ATTACHMENT H-6

D&D VACUUM PUMP DISPOSITION PROCEDURE

NOTE: This is the generic version of the SOP. This SOP should be reviewed and modified, as needed, for each specific project.

1.0 Reason For Issue

This SOP identifies the hazards and provides the necessary controls for the disposition of vacuum pumps. Vacuum pump disposition activities are not covered by an active Facility Safety Plan (FSP) and are not explicitly controlled by other health and safety documentation.

2.0 Work to be Done and Location of Activity

2.1 Work to be Done

D&D/RHWM will assist in the removal, sampling, and disposition of various vacuum pump systems associated with buildings undergoing deactivation or demolition. These systems include pumps potentially exposed to hazardous and radioactive materials, which necessitate specific disassembly, sampling and disposal controls.

2.2 Location

Throughout the Laboratory main site (Site 200), Site 300 and Offsite (as reviewed, approved and authorized through an IWS) in support of D&D field operations.

3.0 Scope of Work to be Done

The scope of work involves the disposition of vacuum pumps during a D&D project. The disposition of vacuum pumps shall be specified in the project specific IWS.

4.0 Hazards Analyses & Controls

4.1 Hazards

Hazards associated with vacuum pump deactivation and disposition activities include possible exposure to, or release of, potentially hazardous and/or radioactive contamination located on external and internal surfaces of pumps and within associated pump oils/fluids.

The following controls will reduce the risk of hazards:

4.1.1 The historical location(s) and associated process systems for each vacuum pump should be identified (when possible) and documented prior to the pump's

deactivation. Each pump and associated attachments will be assigned a unique alphanumeric identification number that reflects the pump's as-found location and process system (when known), e.g., B222 R1703-1-north wall, B222 R1703-2-FHE2, B222 R1703-3-outside.

4.1.2 The following minimum protective clothing and controls are required for pump sampling and disassembly:

a. Safety glasses, safety shoes, double gloves and labcoat or lab issued coveralls.

b. Pump sampling/disassembly/storage shall take place in an area designated by D&D management and ES&H.

c. Double-containment should be utilized during sampling, draining, etc. (e.g., absorbent paper lined phototray). Ensure a spill kit is readily available during all sampling and disassembly activities.

4.1.3 Pump disassembly should be performed at a comfortable height, as pump size and weight permits.

Note: Supplementary PPE and controls may be added on a case-by-case basis, per ES&H discretion, for hazards not identified in this procedure (i.e., vacuum pump labeled as Beryllium Contaminated, etc.).

Sampling Procedure

4.1.4 Evaluate Pump External Surfaces [HC]

a. Direct $\alpha/\beta/\gamma$/x-ray radiation survey

b. $\alpha/\beta/^{3}H$ swipes

c. IH metals swipes, per Industrial Hygienist discretion (based on pump condition and location, etc.)

d. Hg sniffer survey of pump openings

Note: If the sniffer survey detects Hg, RHWM will assume the sampling and disposition process. A pump-specific hazard assessment will be required for further sampling and disposition activities.

4.1.5 The ES&H Team will evaluate the external survey and swipe information to confirm or enhance PPE requirements and pump disassembly procedure.

4.1.6 Drain and sample oil [RHWM]

a. A composite sample of the oil may be obtained from up to 5 pumps, per ES&H Team Discipline/PM instructions. (NOTE: If it is suspected the pump was used in association with explosives processing, the oil sample shall not be combined with other samples.)

b. Submit oil samples to CES or equivalent laboratory

c. If the pump was used in an explosives operation contact and Explosives Safety Engineer for sample disposition.

Note: Oil/fluid samples should be tracked according to their pump ID number(s).

4.1.7 Disconnect pump. Move pump and associated oil to the pre-designated disassembly and sampling area. [Labor]

4.1.8 Disassemble pump [RHWM]

4.1.9 Perform interior surface surveys and inspections

a. Inspect pump internals for chemical buildup.

b. Sampling requirements for pumps that contained oil:

- Direct $\alpha/\beta/\gamma$/x-ray radiation survey [HC]
- $\alpha/\beta/^{3}H$ swipes for each pump [HC]
- IH metals swipes for each pump [HC]

c. Sampling requirements for dry pumps:

Note: Although pumps may appear to be dry, oil might still be trapped in cavities and casings. All pumps destined for scrap or waste must be completely opened to ensure that no flowing liquid remains in the pumps.

- Direct $\alpha/\beta/\gamma$/x-ray radiation survey [HC]
- $\alpha/\beta/^{3}H$ swipes for each pump [HC]
- TTLC swipes for each pump. For grouping of up to 5 pumps (per EA/PM instructions): take one swipe sample from each cavity of the 5 pumps. Combine all 5 swipe tabs into one sample container to establish one representative composite sample. The composite sample shall be sent to CES to be analyzed for TTLC metals and RAD. [HWM]

d. Ensure all freestanding liquids are extracted. Add sorbent material, if needed, to affix residual liquids/sludges.

Disposition

4.1.10 Vacuum pumps intended for Excess, Reuse, Sale, or Scrap shall be released per Document 21.5, "Requirements for Transfer of Equipment and Property for Repair, Reuse, Maintenance, Storage, Excess or Scrap" of the *ES&H Manual*.

4.1.11 Pumps found to contain oil contaminated with radioactive or hazardous materials shall be contained and labeled with the type and amount of the contaminant. The ES&H Team Disciplines, and program management (when applicable) shall determine whether a pump is to be decontaminated or disposed of as hazardous, radioactive, or mixed waste. Decontamination activities require a separate ES&H assessment.

Attachment A

SOP COMMUNICATION FORM

In accordance with the requirements of Section 4.2 (c) of this SOP, The SOP RI SHALL, upon completion of training, ensure that this *SOP Communication Form*, is completed and submitted to the ERD's Assurance Office.

The SOP RI SHALL verify and document that personnel working under the direction of this safety plan read and agree to comply with the safety plan before beginning work on an activity controlled by this safety plan.

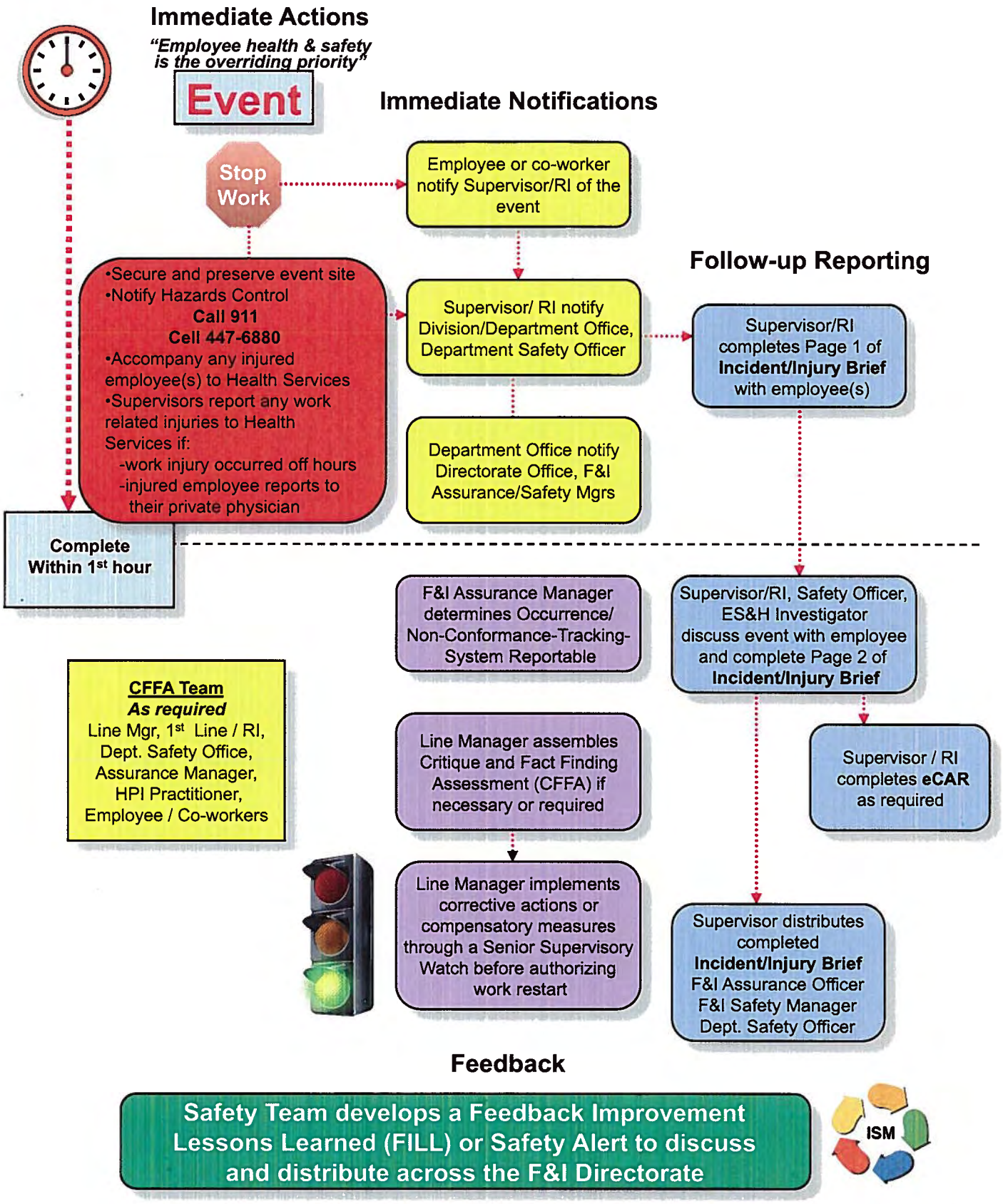
All individuals listed below affirm that they have read and agree to comply with the attached safety plan.

NAME	SIGNATURE	REVIEW DATE

For record keeping purposes, ensure a copy of this completed form is submitted to the Assurance Office after each review.

Attachment B

D&D TEAM – Communication Process Flow Diagram



Attachment C

Subpart T - Demolition

§1926.850

Preparatory operations

(a) **Prior to permitting employees** to start demolition operations, an engineering survey shall be made, by a competent person, of the structure to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. The employer shall have in writing evidence that such a survey has been performed.

(b) **When employees are required** to work within a structure to be demolished which has been damaged by fire, flood, explosion, or other cause, the walls or floor shall be shored or braced.

(c) **All electric, gas, water, steam,** sewer, and other service lines shall be shut off, capped, or otherwise controlled, outside the building line before demolition work is started. In each case, any utility company which is involved shall be notified in advance.

(d) **If it is necessary to maintain** any power, water or other utilities during demolition, such lines shall be temporarily relocated, as necessary, and protected.

(e) **It shall also be determined** if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

(f) **Where a hazard exists from fragmentation of glass,** such hazards shall be removed.

(g) **Where a hazard exists to employees** falling through wall openings, the opening shall be protected to a height of approximately 42 inches.

(h) **When debris is dropped through holes in the floor** without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades not less than 42 inches high and not less than 6 feet back from the projected edge of the opening above. Signs, warning of the hazard of falling materials, shall be posted at each level. Removal shall not be permitted in this lower area until debris handling ceases above.

(i) **All floor openings, not used as material drops,** shall be covered over with material substantial enough to support the weight of any load which may be imposed. Such material shall be properly secured to prevent its accidental movement.

(j) **Except for the cutting of holes in floors for chutes,** holes through which to drop materials, preparation of storage space, and similar necessary preparatory work, the demolition of exterior walls and floor construction shall begin at the top of the structure and proceed downward. Each story of exterior wall and floor construction shall be removed and dropped into the storage space before commencing the removal of exterior walls and floors in the story next below.

(k) **Employee entrances to multi-story structures** being demolished shall be completely protected by sidewalk sheds or canopies, or both, providing protection from the face of the building for a minimum of 8 feet. All such canopies shall be at least 2 feet wider than the building entrances or openings (1 foot wider on each side thereof), and shall be capable of sustaining a load of 150 pounds per square foot.

§1926.851

Stairs, passageways, and ladders

(a) **Only those stairways, passageways, and ladders,** designated as means of access to the structure of a building, shall be used. Other access ways shall be entirely closed at all times.

(b) **All stairs, passageways, ladders** and incidental equipment thereto, which are covered by this section, shall be periodically inspected and maintained in a clean safe condition.

(c) **In a multistory building, when a stairwell is being used,** it shall be properly illuminated by either natural or artificial means, and completely and substantially covered over at a point not less than two floors below the floor on which work is being performed, and access to the floor where the work is in progress shall be through a properly lighted, protected, and separate passageway.

§1926.852

Chutes

(a) **No material shall be dropped** to any point lying outside the exterior walls of the structure unless the area is effectively protected.

(b) **All materials chutes, or sections thereof,** at an angle of more than 45° from the horizontal, shall be entirely enclosed, except for openings equipped with closures at or about floor level for the insertion of materials. The openings shall not exceed 48 inches in height measured along the wall of the chute. At all stories below the top floor, such openings shall be kept closed when not in use.

(c) **A substantial gate shall be installed in each chute** at or near the discharge end. A competent employee shall be assigned to control the operation of the gate, and the backing and loading of trucks.

(d) **When operations are not in progress,** the area surrounding the discharge end of a chute shall be securely closed off.

(e) **Any chute opening, into which workmen dump debris,** shall be protected by a substantial guardrail approximately 42 inches above the floor or other surface on which the men stand to dump the material. Any space between the chute and the edge of openings in the floors through which it passes shall be solidly covered over.

(f) **Where the material is dumped** from mechanical equipment or wheelbarrows, a securely attached toeboard or bumper, not less than 4 inches thick and 6 inches high, shall be provided at each chute opening.

(g) **Chutes shall be designed and constructed** of such strength as to eliminate failure due to impact of materials or debris loaded therein.

§1926.853

Removal of materials through floor openings

Any openings cut in a floor for the disposal of materials shall be no larger in size than 25 percent of the aggregate of the total floor area, unless the lateral supports of the removed flooring remain in place. Floors weakened or otherwise made unsafe by demolition operations shall be shored to carry safely the intended imposed load from demolition operations.

§1926.854

Removal of walls, masonry sections, and chimneys

(a) **Masonry walls, or other sections of masonry,** shall not be permitted to fall upon the floors of the building in such masses as to exceed the safe carrying capacities of the floors.

(b) **No wall section, which is more than one story in height,** shall be permitted to stand alone without lateral bracing, unless such wall was originally designed and constructed to stand without such lateral support, and is in a condition safe enough to be self-supporting. All walls shall be left in a stable condition at the end of each shift.

(c) **Employees shall not be permitted** to work on the top of a wall when weather conditions constitute a hazard.

(d) **Structural or load-supporting members on any floor** shall not be cut or removed until all stories above such a floor have been demolished and removed. This provision shall not prohibit the cutting of floor beams for the disposal of materials or for the installation of equipment, provided that the requirements of §§1926.853 and 1926.855 are met.

(e) **Floor openings within 10 feet of any wall being demolished** shall be planked solid, except when employees are kept out of the area below.

(f) **In buildings of "skeleton-steel" construction,** the steel framing may be left in place during the demolition of masonry. Where this is done, all steel beams, girders, and similar structural supports shall be cleared of all loose material as the masonry demolition progresses downward.

(g) **Walkways or ladders shall be provided** to enable employees to safely reach or leave any scaffold or wall.

(h) **Walls, which serve as retaining walls** to support earth or adjoining structures, shall not be demolished until such earth has been properly braced or adjoining structures have been properly underpinned.

(i) **Walls, which are to serve as retaining walls** against which debris will be piled, shall not be so used unless capable of safely supporting the imposed load.

§1926.855
Manual removal of floors

(a) **Openings cut in a floor shall extend** the full span of the arch between supports.

(b) **Before demolishing any floor arch,** debris and other material shall be removed from such arch and other adjacent floor area. Planks not less than 2 inches by 10 inches in cross section, full size undressed, shall be provided for, and shall be used by employees to stand on while breaking down floor arches between beams. Such planks shall be so located as to provide a safe support for the workmen should the arch between the beams collapse. The open space between planks shall not exceed 16 inches.

(c) **Safe walkways, not less than 18 inches wide,** formed of planks not less than 2 inches thick if wood, or of equivalent strength if metal, shall be provided and used by workmen when necessary to enable them to reach any point without walking upon exposed beams.

(d) **Stringers of ample strength shall be installed** to support the flooring planks, and the ends of such stringers shall be supported by floor beams or girders, and not by floor arches alone.

(e) **Planks shall be laid together over solid bearings** with the ends overlapping at least 1 foot.

(f) **When floor arches are being removed,** employees shall not be allowed in the area directly underneath, and such an area shall be barricaded to prevent access to it.

(g) **Demolition of floor arches shall not be started** until they, and the surrounding floor area for a distance of 20 feet, have been cleared of debris and any other unnecessary materials.

§1926.856
Removal of walls, floors, and material with equipment

(a) **Mechanical equipment shall not be used** on floors or working surfaces unless such floors or surfaces are of sufficient strength to support the imposed load.

(b) **Floor openings shall have curbs or stop-logs** to prevent equipment from running over the edge.

(c) **Mechanical equipment used** shall meet the requirements specified in Subparts N and O of this part.

§1926.857
Storage

(a) **The storage of waste material and debris on any floor** shall not exceed the allowable floor loads.

(b) **In buildings having wooden floor construction,** the flooring boards may be removed from not more than one floor above grade to provide storage space for debris, provided falling material is not permitted to endanger the stability of the structure.

(c) **When wood floor beams serve to brace interior walls** or free-standing exterior walls, such beams shall be left in place until other equivalent support can be installed to replace them.

(d) **Floor arches, to an elevation** of not more than 25 feet above grade, may be removed to provide storage area for debris: Provided, that such removal does not endanger the stability of the structure.

(e) **Storage space into which material is dumped** shall be blocked off, except for openings necessary for the removal of material. Such openings shall be kept closed at all times when material is not being removed.

§1926.858
Removal of steel construction

(a) **When floor arches have been removed,** planking in accordance with §1926.855(b) shall be provided for the workers engaged in razing the steel framing.

(b) **Cranes, derricks, and other hoisting equipment used** shall meet the requirements specified in Subpart N of this part.

(c) **Steel construction shall be dismantled** column length by column length, and tier by tier (columns may be in two-story lengths).

(d) **Any structural member being dismembered** shall not be overstressed.

§1926.859
Mechanical demolition

(a) **No workers shall be permitted in any area,** which can be adversely affected by demolition operations, when balling or clamming is being performed. Only those workers necessary for the performance of the operations shall be permitted in this area at any other time.

(b) **The weight of the demolition ball** shall not exceed 50 percent of the crane's rated load, based on the length of the boom and the maximum angle of operation at which the demolition ball will be used, or it shall not exceed 25 percent of the nominal breaking strength of the line by which it is suspended, whichever results in a lesser value.

(c) **The crane boom and loadline shall be as short as possible.**

(d) **The ball shall be attached to the loadline** with a swivel-type connection to prevent twisting of the loadline, and shall be attached by positive means in such manner that the weight cannot become accidentally disconnected.

(e) **When pulling over walls or portions thereof,** all steel members affected shall have been previously cut free.

(f) **All roof cornices or other such ornamental stonework** shall be removed prior to pulling walls over.

(g) **During demolition continuing inspections** by a competent person shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, or walls, or loosened material. No employee shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means.

§1926.860
Selective demolition by explosives

Selective demolition by explosives shall be conducted in accordance with the applicable sections of Subpart U of this part.

1926 Subpart T

Authority for 1926 Subpart T

Authority: Sec. 107, Contract Work Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), or 9-83 (48 FR 35736), as applicable.

Attachment D

Project	RI	Project #	Timeline MOU	Initial Planning Authorizations								Regulatory Approval for Demo						Planning & Authorizations						Characterization				Deactivation Planning				Project Set Up									Execution									Close	
				Project Data Sheet (AKA Project Criteria Sheet)	Financial Request for Approval	LSO Project Authorization	WAS From DOE HQ	Develop SAT Charter and Mission Need Sheet	CD-0 (STM Charter) Approve Mission Need & Planning $	Authorization Letter from LSO	Establish Project Binder	Are Remediable	Historical Information Gathering	PE Findings & Determination Letter	DOE HQ ATD	NEPA	NHPA	PWP Including Sched and $ Estmp	Negotiation Strategy	CD-1 PEP, Acq Strategy, $ Estmp, Appr	Procurement MOW & Purchase Requisition	PWS under PWS Development & Green Light	Issue RFP	Planned Operations Map Development	Sample Plan Development	Sampling Pre-Start	Contract Preliminary Sampling	Area Deactivation Map	Asbestos Map	Electrical Deactivation Plan Development	Mechanical Deactivation Plan Development	Potential Benefits Schedule	CD-3/2 Approval to Spend $ Pre-Demo	Site Remediable	Property LSO / Transfer	Water Blocks Set Up	Obtain Fire Department Approval of Foam Lists	Set Up Project Boundary (Fence Line)	WAS Set Up	Advance Permit Submitted (10 Day Wait)	Demolition Permit (10 Day Wait)	Deactivation Pre-Start	Deactivation Field Work	Contractor Submitch for Review	Contractor Review NTP & Mobilize	Abatement & Demolition Pre-Start	Abatement & Demolition Field Work	Final Comment	
FY08 D&D Plan & Prep	Auble	n/a	n/a	X	X		X	N/A	N/A		X	N A	IP	N A	N A	N/A	N A																																		
443/444 FIRP D&D	Rob																																																		
175 D&D Planning																																																			
FY08 FIRP Trailers	Dennis																																																		
1400 Trailers TD D&D	Michele																																																		
243 TD D&D	Michele																																																		
292 TD D&D (413.3A)	Rob																																																		
241 TD D&D (413.3A)	Dennis																																																		
FY09 Misc Trailers																																																			
321BE (IFM)																																																			
B443/444 D&D	Robison	Divoky									X													X	X			X				IP	N/A																		Waiting for project approval. Most planning was conducted in FY05. Planning does need to be re-visited.
SAT Waste Disposal	Robison	Divoky																																																	Waiting for project approval.

Attachment D-2

FY09 Project Assignments D-2

Project	RI	Alt RI	Start	Finish		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP

Attachment D-3

PROJECT	RI	Alt RI	IFC (K)	FRLP (K)	Office of Science (K)	Other	Effort Total		Senior PM	Project Manager	EM Coord	CAD	Cost Est/Sched	Info Manager	Admin	Tm 2 Deputy TL	Tm 2 Sec	DR	H&S Tech Sup	H&S Tech	HP	RI	IS	FP	EA	RCWM Waste Mngr	RCWM Techs	RCA	Craft Super	Electrician	Laborer G&D Workers	Plumber	Effort Cost
FY07									Projects							ES&H Team 2												Crafts					
								Program FTEs	0.50	0.50	0.00	0.00	0.50	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
						G&A / IFC		Hrs	897	0	0	0	0	168	470	0	0	0	0	672	0	0	0	0	0	0	0	0	0	0	134	0	
								$	-	-	-	-	-	11,073	17,235	-	-	-	-	33,419	-	-	-	-	-	-	-	-	-	-	7,823	-	69,549
						PMC		Hrs	0		0	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
								$	86,112	-	-	-	-	-	1,247	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	87,359
								Total Hrs	897	-	-	-	-	168	504	-	-	-	-	672	-	-	-	-	-	-	-	-	-	-	134	-	
								Total $s	86,112	-	-	-	-	11,073	18,482	-	-	-	-	33,419	-	-	-	-	-	-	-	-	-	-	7,823	-	156,908
								Project FTEs	0.50	1.50	1.00	0.75	0.50	0.75	0.80	0.45	0.35	0.50	0.40	2.05	0.20	0.25	0.30	0.15	1.00	0.00	2.00	0.35	0.30	1.16	1.00	0.18	
FY06 Trailers	Dennis	Joe		1,198			607,976	FTEs	0.093	0.304	0.030	0.021	0.023	0.010	0.020	-0.059	-0.099	0.000	0.029	0.402	0.247	0.200	0.110	0.005	0.163	0.141	0.461	0.000	0.079	0.084	0.380	0.013	
				+roll over				Hrs	183	600	60	41	45	20	40	-118	-198	0	58	793	487	395	216	10	321	278	911	0	158	165	750	25	
								$	28,548	84,000	6,480	4,387	6,930	2,320	3,080	(26,300)	(17,640)	-	9,338	68,991	74,511	54,910	27,250	1,250	39,483	41,650	69,236	-	22,932	21,120	76,500	3,200	607,976
443/444	Joe	Rob		1,292			279,323	FTEs	0.018	0.532	0.000	0.000	0.097	0.010	0.005	0.018	0.018	0.000	0.018	0.178	0.000	0.018	0.071	0.020	0.018	0.000	0.000	0.000	0.020	0.000	0.055	0.000	
				+roll over				Hrs	35	1051	0	0	192	20	10	35	35	0	35	352	0	35	140	40	35				40		106		
								$	5,460	147,140	-	-	29,568	2,320	770	6,125	3,150	-	5,635	30,624	-	4,830	17,500	5,000	4,305	-	-	-	5,880	-	11,016	-	279,323
							27,920	FTEs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.041	0.041	0.041	0.000	0.000	0.000	0.000	0.000	
								Hrs																	80	80	80						
								$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,840	12,000	5,080	-	-	-	-	-	27,920
							341,200	FTEs	0.041	0.253	0.101	0.081	0.010	0.020	0.020	0.010	0.008	0.000	0.010	0.051	0.051	0.030	0.010	0.005	0.051	0.051	0.020	0.000	0.000	0.284	0.284	0.041	
							56,400.0	Hrs	80	500	200	120	20	40	40	20	15	0	20	100	100	60	20	10	100	100	40			560	560	80	
								$	12,480	70,000	21,600	12,840	3,080	4,640	3,080	3,500	1,350	-	3,220	8,700	15,300	8,280	2,500	1,250	12,300	15,000	3,040	-	-	71,680	57,120	10,240	341,200
							104,853	FTEs	0.003	0.081	0.005	0.005	0.020	0.000	0.005	0.003	0.001	0.000	0.002	0.061	0.210	0.010	0.020	0.005	0.041	0.000	0.020	0.000	0.014	0.041	0.081	0.020	
							34,049.0	Hrs	5	160	9	9	40	0	9	5	2	0	4	120	20	20	40	10	80	0	40	0	28	80	160	40	
								$	760	22,400	972	963	6,160	-	693	875	180	-	644	10,440	3,060	2,760	5,000	1,250	9,840	-	3,040	-	4,116	10,240	16,320	5,120	104,853
FY06 D&D Plan & Prep	Auble	n/a		1,106			-	FTEs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
								Hrs																									
								$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Office of Science							-	FTEs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
								Hrs																									
								$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
								Hrs																									
								$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							-	FTEs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
								Hrs																									
								$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							68,458	FTEs	0.003	0.025	0.000	0.000	0.004	0.002	0.002	0.002	0.001	0.000	0.001	0.086	0.007	0.015	0.003	0.000	0.004	0.000	0.012	0.000	0.025	0.004	0.342	0.000	
								Hrs	6	49	-	-	8	4	4	4	2	-	2	158	13	29	5	-	8	-	24	-	49	8	676	-	
								$	576	4,165	-	-	752	284	188	425	110	-	196	8,374	1,209	2,465	385	-	608	-	1,194	-	4,410	624	42,588	-	68,458
							98,396	FTEs	0.006	0.122	0.000	0.000	0.012	0.009	0.005	0.005	0.001	0.005	0.005	0.132	0.026	0.013	0.005	0.000	0.026	0.013	0.132	0.000	0.013	0.000	0.212	0.000	
								Hrs	15	240	-	-	24	18	10	10	10	10	10	260	52	26	10	-	52	26	260	-	26		418		
								$	1,440	20,400	-	-	2,256	1,278	470	1,070	550	1,430	980	13,780	4,836	2,210	770	-	3,900	2,392	11,960	-	2,340	-	26,334	-	98,396
							-	FTEs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
								Hrs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
								$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							-	FTEs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
								Hrs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
								$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							-	FTEs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
								Hrs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
								$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							-	FTEs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
								Hrs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
								$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unallocated			1,199,000																														

Attachment E

FY07 Engineering Technolgy Profile Summary Report: PFN: 321-2007-001

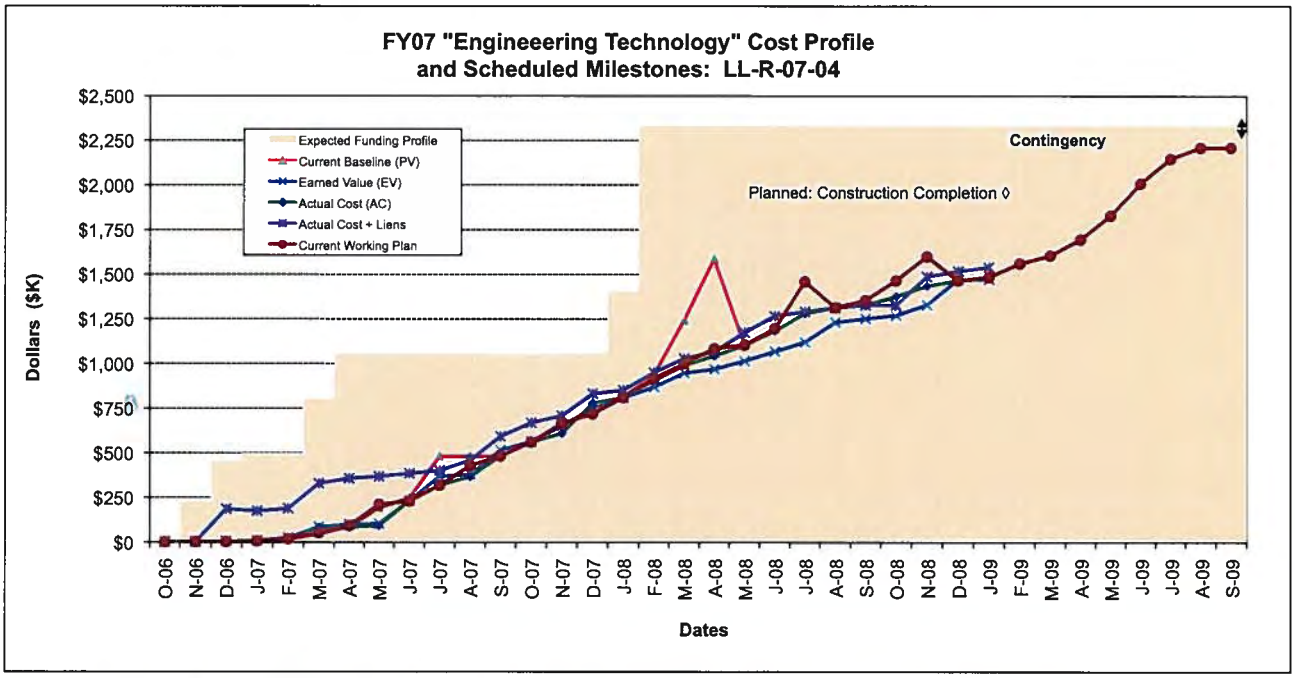
(Show 6-months of Data)

Date Thru	Cummulative PV ($K)	Cummulative AC ($K)	Cummulative EV ($K)	CV ($K) (EV-AC)	CPI (EV/AC)	SV ($K) (EV-PV)	SPI (EV/PV)
24-Jan-09	1484	1478	1472	-6	1.00	-12	0.99
27-Dec-08	1465	1465	1472	7	1.00	7	1.00
29-Nov-08	1600	1436	1330	-106	0.93	-270	0.83
Oct 25,2008	1465	1377	1271	-106	0.92	-194	0.87
Sep 27,2008	1354	1327	1252	-75	0.94	-102	0.92
Aug 30,2008	1314	1314	1232	-82	0.94	-82	0.94

CPI:SPI Color Key

- >0.90
- 0.85-0.90
- <0.85

PM: Matt Mlekush



Project Start: 11/15/06 **Project End**: 10/30/08
Actual Start: 11/18/06 **Act. Proj. End**: TBD

Project Budget w/Contingency ($K)	$2,330
Authorized Funding to Date ($k):	$2,330
Budget At Completion (BAC) ($k):	$2,210
Actual Cost (AC) to Date ($k):	$1,478
Estimate To Complete (ETC) ($k):	$732
Estimate At Completion (EAC) ($k): (AC+ETC)	$2,210
Remaining Budget ($k): (BAC-AC)	$732
Variance At Completion ($k): (BAC-EAC)	$0
Contingency Budget ($k):	$120
Unconstrained Contingency Remaining ($k):	$120
Calculated Risked Based Contingency ($k):	$159
Mgmt. Reserve Available for Recapture ($k): (Negotiated Each Month with Program Lead or PD Lead)	**$0**

Briefly Define Project Scope: (Total DM: $1,396,734)

FY07 Construction
* B-321: Replace two Motor Control Centers
* B-131: Replace High Bay, Room 1400 HEPA

FY08 Construction
* B-321: Replace Unit Substation
* B-321: Replace Air Handling Units, Fans & Pumps
* B-321: Replace Feeder Cables from Unit Sub to distribution loads
* B-321: Replace remaining two Motor Control Centers

What Project Concerns Keeps You Up At Night?
*Transformer size will increase from 1500 KVA to 2000KVA due to B-321C consolidation efforts. Will adveresly impact both cost and schedule.

Cell contains formula, do not overwrite Cell to be updated each month by PM

Cost Performance Index Detail: **1.00**

Cost Performance Recovery Plan:

Schedule Performance Index Detail: **0.99**

Schedule Performance Recovery Plan:

Attachment F

Attachment F

D&D Protocols

D&D Team Standardized Equipment & Material Release Protocols

Releasing equipment and material from offices, laboratories, transportainers, storage areas and construction or demolition sites requires coordination and concise communication between all participants.

The following criteria apply to all D&D activities involving personal property/material release:

a) Material and equipment removed from D&D project areas will be labeled/color coded.

b) Labels bearing the D&D logo with either a red, blue or green D&D logo will be used for individual items or containers of items. Red, blue or green spray paint will be used to identify large bulky items, usually originating from demolition projects.

c) Color-coded items should be segregated to maintain positive control.

d) Attaching pictures/diagrams to release documentation is encouraged but is not required for releasing equipment or items.

e) Survey and documentation requirements depend on the perceived, real or expected hazards associated with a given project. The Protocol Level will be assigned at the beginning of the project.

A color code will be utilized as follows to communicate the status or level of concern for equipment undergoing release:

Colored labels or paint should be applied to be easily visible.

When changing the color code on an item, the previous color should be completely covered by the new color, or painted over with black. Green and Blue color can be applicable only after release memorandum or e-mail is received from the EA.

The color code follows the format detailed below:

Red	A red label or paint will be used to identify items that cannot be free-released or items that are not to be moved from their project area.
Green	A green label or paint indicates the item(s) can be released unconditionally to the equipment end point destination (re-use, DUS, scrap, etc.).
Blue	A blue label or paint will be applied on materials identified as controlled disposal to the Municipal Landfill (non-recyclables)
Black	The color black is used to obscure previously applied colors and also used to write comments.

Roles, Responsibilities, and Authorities

Project Responsible Individual:

In conjunction with the ES&H disciplines, establishes project Protocol Level.
Informs all project participants of the selected Protocol Level and posts the procedure at the worksite.
In conjunction with the ES&H disciplines approves changes in Protocol Level or modifications to the specific project use of the selected Protocol.
Obtain and control official release memos.

Project Assigned D&D Health & Safety Technician:

In conjunction with the EA and HP is Responsible for releasing equipment and material from all D&D-controlled project areas.

Project Assigned D&D RHWM Technician:

Accountable for all hazardous waste manifesting, documentation, shipping

Project Assigned D&D Laborer:

Responsible for loading and transporting materials to DUS, municipal landfill, and other laboratory locations as directed by the Responsible Individual.
The Project Assigned D&D Laborer is also responsible for coordinating the Sunflower reports for non-hazardous materials.

Description of Protocols

Regardless of equipment end point destination—reuse, recycling, or disposal—the following protocols apply to all equipment and material released or transferred from D&D projects. Four different Protocol Levels have been defined:

1) Examples of Level One projects includes transportainer clean outs, ventilation system dismantlement where contamination is possible, and laboratory reconfigurations involving known contamination.
2) Level Two applies primarily to radioactive material management areas (RMMAs).
3) Examples of Level Three projects include clean out of low level radioactive material area (RMA) laboratories, rooms/lockers where only sealed radioactive sources were stored, offices adjacent to RMMAs or non-rad laboratories, and removal of uncontaminated construction debris from demolition projects.
4) Examples of Level Four projects include clean out or migrations of offices, conference rooms, or non-hazardous storerooms.

Level One Release Protocol

A Level One Release Protocol is the highest level of concern and applies to large or small projects that involve:

Known or expected hazardous and/or radioactive materials that could pose an immediate hazard to personnel;

Items/areas for which insufficient historical documentation exists; and

Jobs that require a database or inventory to keep track of the large number of items generated and sampled or surveyed.

Required surveys and documentation:

Documented radiation dose rate surveys of the object(s) or container(s), as applicable.

Documented direct surface contamination surveys (HP/IH) of the object(s) or container(s), as applicable.

Documented contamination swipe surveys (HP/IH/EA) of the object(s) or container(s), as applicable.

Inventory list or database of equipment or material where sample tracking is required.

Completed Equipment/Property Release Form for each item or list of related items, other than waste, that will be moved to new location.

Controls:

Materials and equipment shall be segregated prior to loading by color code identification.

A D&D H&S Technician (or RI-approved alternate) must verify proper color- coding on all materials removed for disposal as they are being loaded.

Where a release memo is issued specifying items or equipment to be released, and the memo specifies the item by a unique number, a copy of the memo will be used to check off each item as it is being loaded. The checked off memo will be forwarded to the EA.

Level Two Release Protocol

A Level Two Release Protocol is the second highest level of concern and applies primarily to radioactive material management areas (RMMAs), and laboratories/projects where:

There are known or expected hazardous and/or radioactive materials that could pose an immediate hazard to personnel, and sufficient historical documentation exists.

Required surveys and documentation:

Documented direct surface contamination surveys (HP/IH) of the object(s) or container(s), as applicable.

Documented contamination swipe surveys (HP/IH/EA) of the object(s) or container(s), as applicable.

Completed Equipment/Property Release Form for each item (or container of related items), other than waste, that will be moved to new location.

Controls:

Materials and equipment should be segregated by color code prior to loading. A D&D H&S Technician (or RI-approved alternate) must verify proper color-coding on all materials removed for disposal as they are being loaded.

Level Three Release Protocol

A Level Three Release Protocol applies primarily to large or small projects in non-RMMA spaces that involve:

Few or no hazardous and/or radioactive materials that could pose an immediate hazard to personnel, and sufficient historical documentation exists.

Required surveys and documentation:

Informal direct surface contamination surveys (HP/IH) of the object(s) or container(s), as applicable.

Informal radioactive contamination (large area) wipe-surveys of the object(s) or container(s), as applicable.

IH metals swipes, per IH direction.

Note: If completed Equipment/Property Release Forms are required for any item, the abovementioned surveys must be documented.

Controls:

If unexpected contamination levels or amounts of hazardous materials are discovered, the RI will reevaluate the release protocol level.

Materials and equipment should be segregated by color code prior to loading.

A D&D H&S Technician (or RI-approved alternate) must verify proper color- coding on all materials removed for disposal as they are being loaded.

Level Four Release Protocol

A Level Four Release Protocol applies to projects in non-hazardous spaces that involve:

No known or expected hazardous and/or radioactive materials that could pose an immediate hazard to personnel; and

Sufficient historical documentation exists.

Required surveys and documentation:

Informal direct surface contamination surveys (HP/IH) of the object(s) or container(s), as applicable.

Informal radioactive contamination (large area) wipe-surveys of the object(s) or container(s), as applicable.

Green D&D label or sign posted at the entrance to the room indicates all unlabeled items in the room may be moved to the new location.

Red D&D label on items that are not to be moved.

Controls:

If unexpected contamination levels or amounts of hazardous materials are discovered, the RI will reevaluate the release protocol level.

The D&D H&S Technician will identify items that are not to be removed to the D&D co-workers prior to starting the move.

Property Relocation Requirements

The following steps apply to all projects regardless of Protocol Level:

1. The Project RI obtains a Sunflower Report sorted by building/trailer and room # just prior to demolition or room clean out. The web address is:

   (https://www-ais.llnl.gov/llnl_only/docs/bsd/property/reports.html)

2. On the day that the relocation begins, the Lead Laborer verifies status of property on report:

   Verify items on list actually located in room (with a check next to the property #)
   Record those items in room, not on list (Property # Only)
   Mark items on list not located in room (with a N/H)

3. The Client determines whether property will:

   Move to the new location (Bldg & Rm#) or
   Be released for disposal or
   Stay in room

4. The Lead Laborer records the end point status on the Sunflower Report.

5 If going to DUS, D&D will complete the Excess Equipment Form (LL6348) and have the responsible Property Center sign off on the form. A copy will go to the Property Center and be retained with the project file.

6. If property is moving to a new location, record new Building and Room # on Sunflower Report.

7. The Lead Laborer will obtain a signature from the Client on all release documents.

8. The project assigned D&D H&S Technician will approve the equipment release.

9. Once all notations have been placed on the Sunflower Report a copy will be sent to the Property Representative and the original will be filed in the project file.

10. Property SHALL NOT be moved until the property release form is signed by all parties and permission to disposition the property is given by the property representative.

Releasing Non-Hazardous Waste from D&D-owned WAAs for Disposal or Recycling

1. D&D Technicians request a signed Release Memo for numerous or complex groups of items or an email for a relatively small number of items from the D&D EA, with concurrence from the ES&H Team IH and/or HP, for waste items released for disposal or recycle.
2. The EA forwards a Release Memo with identification numbers or unique visual identification information for each release item to the D&D Technicians.
3. D&D Technicians will sort materials identified in the release memo into a segregated area separated from the remaining non-released materials.
4. D&D Technicians will verify that each sorted item is identified on the signed current release memo.
5. D&D H&S Technicians will physically mark the waste identified for release as follows:

   For DUS, mark with green code (without obscuring the identification number) and attach the Equipment/Property Release Form.

   For controlled municipal landfill, completely mark out the previous color code and apply a blue color code (without obscuring the identification number).

   For unrestricted municipal landfill or recycling, completely mark out the previous color code and apply a green color code (without obscuring the identification number).
6. As the items are loaded on the truck for transport, a D&D H&S Technician will perform the following final check:

   Compare and verify each identification number to the Release Memo, and

   Ensure that items loaded on the truck are correctly color-coded for the transport, and verify that hazardous material labels (i.e., radiation stickers, beryllium contamination labels, etc.) have been obliterated or otherwise removed.
7. The initialed Release Memo is returned to the Project RI.

Attachment G

FY09 Trailer Demo Sampling Plan

Discipline	Purpose	Building Component (sheetrock, floor tile, fume hood etc.)	Location	Sampling Method	Sampling Tech (RHWM or H&S or Contractor)	Analytical Method	Analysis Turn Around Time	Estimated # of samples	Estimated Cost	Responsible Lab (RML, CES, ALAB, Contractor)	Additional Comments	Status/Analytical Result
EA	Characterize Siding	Wood Siding	213	Core (Bulk) Sample	RHWM Sample Team	GAB, H3, TTLC, STLC, TCLP	6 weeks	2 (location TBD)	$650 per sample plus sample team time (6-8 hours)	Off-site		
EA	To Determine Disposition	Excavated and/or Potholed Soil	213	Composite Bulk Sample	ESPD Tech	GAB, H3, TTLC, STLC, TCLP	6 weeks	1	$650 per sample plus ESPD Tech time (2 hours)	EMRL		
EA	Characterize for Disposal	Roof	213	Bulk Sample	RHWM Sample Team	GAB, H3, TTLC, STLC, TCLP	6 weeks	1	$650 per sample plus sample team time (4-6 hours)	Off-site	This building was constructed in 1964, if the original roof material is present, we need to sample.	
IH	Site wide asbestos confirmation	Ceiling tiles, tile/sheet flooring/mastic, wallboard, joint compound, roofing, roofing mastic, pipe insulation, and other suspect materials	213	Bulk Sample	Qualified Asbestos Inspector	Asbestos	5-7 days	25	$25/sample	Microanalytical	Refer to Master Facility Asbestos Sampling Report	
EA/HP	Characterize for Disposal	P-trap (Janitor's Sink)	213, Room 100C	Direct a/b survey and tab swipes of p-trap interior	H&S Tech	GABT	2-3 days	1	N/A	RML		
HP	Characterize for Disposal	Flooring	1401	Survey	H&S Tech	Direct a/b Survey	Immediate	1 per entrance/exit	N/A	N/A		
IH	Site wide asbestos confirmation	Ceiling tiles, tile/sheet flooring/mastic, wallboard, joint compound, roofing, roofing mastic, pipe insulation, and other suspect materials	1401	Bulk Sample	Qualified Asbestos Inspector	Asbestos	5-7 days	25	$25/sample	Microanalytical	Refer to Master Facility Asbestos Sampling Report	

FY09 Trailer Demo Sampling Plan

Discipline	Purpose	Building Component (sheetrock, floor tile, fume hood etc.)	Location	Sampling Method	Sampling Tech (RHWM or H&S or Contractor)	Analytical Method	Analysis Turn Around Time	Estimated # of samples	Estimated Cost	Responsible Lab (RML, CES, ALAB, Contractor)	Additional Comments	Status/Analytical Result

- conditional sampling requested by EA
- Samples not taken
- Samples Taken waiting for analysis
- Okay for scrap/reuse
- Releasable for landfill
- Results show this must be managed as haz or rad waste
- Not required based on historical information

Enclosure 3

B-419 Hazard Assessment and Control Forms

Hazard Assessment and Control Form

This document summarizes key hazards and controls needed to perform work including, in some cases, specific respirators to be used. **This document is *not* a work authorization.**

File name: Sitewide_Silica_ConSaw_JackHammer_0709		Prep/Last rev. Date(s): 6/22/10
Prepared by (list all): Philip A. Bumala	Discipline reviewed by (list all): Diane Cuyle	Expiration Date: 12/31/10

Operation Description

Building: D&D B-419	Room/Area: Varius		IWS/Authorizing document: 15672
ES&H Team: 2	Program: Plant Engineering / D&D		Operation Start Date: 6/23/10
RI (also list supervisor, if needed): Joe Albert	Employee No(s). 81C777	Phone/Page No(s). 580-4178 / Ext. No. 2-6544	
Operation: Concrete/Asphalt sawing and Jack Hammering		Hours/Day: 8	Days/Year: 50

Overall Operation Description:
Concrete saw cutting (i.e. Consaw) and Jack Hammering activities wide.

Both of these activities are known to generate worker breathing zone levels of respirable silica aerosols in excess of the new (2008) ACGIH TLV of 0.025 mg/m3. Saw cutting (i.e. using a consaw) into concrete/asphalt is done "wet" by virtue of the saw's integral water applicator. Noteworthy relative to the operation is the fact that the water application is designed to cool and protect the saw blade, and NOT to mitigate operator exposures to respirable silica aerosols. Respiratory protection is required at all times, regardless of duration, until further notice. Refer to the Hazard Evaluation Section of this HAC for details.

The doning of respiratory protection during Jackhammering of concrete/asphalt shall continue be required. Dust suppression as noted in the Engineering Controls of this HAC shall be utilized.

Personnel

Personnel Involved — See IWS ☒ See following list ☐:

Name(s) (Use Continuation Section if >20 people are involved)	LLNL Employee No.	Job Category Code

Comments:		

Respiratory Protection

Air Purifying Respirators:

Activities: Describe work in each phase/activity in enough detail to justify respirator selection and avoid confusion with other activities.			
	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
	Description of work: Concrete/Asphalt saw cutting of lengths to be determined, presumably for a duration of up to 8 hours, indoors or outdoors. Half-face air purifying respirator (APR) equipped with P-100 cartridges as a minimum requirement for using hand held saws or operations using "walk behind" saws. Exception: In the rare instance cutting is on a "floating" HVAC slab resulting in rapid water runoff below the blade. Contact the local IH if the condition is suspect. A Full face or PAPR is a user option.	Description of work: Jackhammering concrete/asphalt surfaces, presumably for a duration of up to 8 hours, indoors or outdoors. Half face APR with P100 is minimum required. Full face or PAPR is a user option.	Description of work:
Filter/Cartridge Type	☐	☐	☐
P100/HEPA	☒	☒	☐
Other:	☐	☐	☐
Canister (specify type)	☐	☐	☐
Configuration	☐	☐	☐
1/2 Mask APR	☒	☒	☐
Other: PAPR optional	☒	☒	☐
Frequency of respirator exchange (if not after eight hours that can be spread over up to five work days; also provide cartridge changeout schedule):	Daily or when filter becomes clogged making breathing difficult.	Daily or when filter becomes clogged making breathing difficult.	
OK to reuse filter? No *Dispose of filter as HW and clean masks before return?* Yes. Note decontamination instructions in the following "Comments" section. For filtering facepiece respirators only: *Is this respirator being used to prevent allergic reactions?* No , *Is this respirator being used for personal comfort/preference?* No			
Comments: Filtering face piece respirators (dust masks or N95's) are prohibited.			

Air Supplied Respirators

	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
Operating Type	☐	☐	☐
Constant flow	☐	☐	☐
Pressure demand	☐	☐	☐
Type	☐	☐	☐
Abrasive blaster's hood	☐	☐	☐
Other:	☐	☐	☐
Air source/location			

Comments:

Issue Point Administrator	Respirtors Services	Badge No.	
Issue Point Location	Respirator Shop		

Other PPE

Personal Protective Equipment:

For engineering controls - see IWS ☐ See the IWS and this section of the HAC ☒ See this section ☐			
	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
Eye protection	☒ Consaw: Safety glasses with side shields unless wearing full face respirator	☒ JackHammering: Safety glasses with side shields unless wearing full face respirator	☐
Garments	☒ Disposable coveralls or work issued clothing	☒ Disposable coveralls or work issued clothing	☐
Gloves	☒ Leather or appropriate Voltage Rated, insulated gloves, as needed	☒ Leather or appropriate Voltage Rated, insulated gloves, as needed	☐
Head protection	☒ Hardhat	☒ Hardhat	☐
Hearing protection	☒ Double hearing protection required for walk behind saw. Earplugs with NRR of 29 for hand held unit.	☒ Double hearing protection required, Earplugs with NRR of 29.	☐
Safety shoes	☒ Required	☒ Required	☐
Shoe covers	☐	☐	☐
Other PPE controls	☐	☐	☐
Comments: Remove disposable clothing prior to removing respirator.			

Engineering Controls

For engineering controls - see IWS ☐ See the IWS and this section of the HAC ☒ See this section ☐			
	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
Eyewash/Shower	☐	☐	☐
Glovebox	☐	☐	☐
Hood/fan number	☐	☐	☐
Interlocks	☐	☐	☐
Portable ventilation	☐	☐	☐
Other engin. controls	☒ Pre wet concrete surface prior to consaw activity. Use wet/dry HEPA vacuum to remove slurry created by cutting operations; dispose of according to EA guidelines.	☒ Throughly wet area prior to and during jackhammering. Water must be applied using a garden hose or equivalent with a nozzel creating a fine mist. A Hudson sprayer is not adequate.	☐
Comments: Wet area of initial contact prior to and periodically during cutting or Jack Hammering .			

Administrative Controls

For administrative controls - see IWS ☐ See the IWS and this section of the HAC ☒ See this section ☐			
	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
Training Requirements:			
Respirator-related	☒ HS4610 W	☒ HS4610 W	☐
HAZCOM-related	☒ Safety Tailgate meeting for crystalline silica .	☒ Safety Tailgate meeting for crystalline silica.	☐
Posting/labeling	☐	☐	☐
HHC Poster	☐	☐	☐
Other signs/labels	☒ Caution tape establishing a Control Zone	☒ Caution tape establishing a Control Zone	☐
Other admin. controls	☒ Prohibit non-essential personnel and those without equivalent PPE within 30 feet of the work operations. Complete a ProcCon Permit.	☒ Prohibit non-essential personnel and those without equivalent PPE within 30 feet of the work operations. Complete a ProcCon Permit.	☐
Medical surveillance? Respirator: ☒ Hearing protection: ☒ Other: ☐			
Comments: Use GFCI on any electrical equipment. Do not allow water to flow into drainage system or swale. Wash skin with soap and water. Do not use compressed air, or shake disposable clothing to remove dust.			

Additional Control Requirements

(Use Continuation Section if there are more than 10 comments)

All Jack Hammering activities shall utilize shift rotations to mitigate vibration/ergonomic hazards.

Hazard Evaluation

Hazard(s): Concrete/Asphalt saw cutting (i.e. Consawing) and Jackhammering activities are know to generate respirable silica aerosols in excess of the most recent applicable ACGIH TLV. Exposure to respirable crystalline silica (quartz type). Crystalline silica is frequently found in most road building materials, including concrete, asphalt, and other masonry products. Excessive exposure to crystalline silica has been known to cause silicosis, a non-reversible and often fatal lung disease.

Notes: 1) The noise route of exposure is the sound presure level received by the ear, not Inhalation (a modification is not possible via the form).

2) Jack Hammer: Vibration Hazads / Ergonomic guideance is provided by the 2008 ACGIH TLVs and BEIs for chemical substances and Physical Agents, Hand-Arm (segmental) Vibration, as follows,
"It should be recognized that control of hand-arm vibration syndrome (HAVS) from the workplace cannot occur simply by specifying and adhering to a given TLV. The use of; 1) antivibration tools, 2) antivibration gloves, 3) proper work practices that keep the worker's hands and remaining body warm and also minimize the vibration exposure, and 4) a conscientiously applied medical surveillance program are all necessary ro rid HAVS from the workplace."

Potential for: Confined space entry ☐ Permit confined space entry ☐ Oxygen deficiency ☐ IDLH ☐

Assign a number to each agent. Assign a lower-case letter after each number if more than one route of exposure is possible.

#	Agent(s) (Use Continuation Section if >10 agents are involved)	Exposure Level	Exposure Limit Type	Route(s) of Exposure	Evaluation Type	Current OEL	OEL Source
	Crystalline Silica	> 0.025 mg/m3	TWA	Inhalation	Measured at L	0.025 mg/m3 ACGIH	TLV
	Noise	> 85 dba Other (use Con	TWA	Inhalation	Measured at L	85 dba	TLV
	Particulate Not Otherwise Specified (PNOS) – respirable fraction	<3.0 Respirable & <10 mg/m3 Inhalable mg/m3	TWA	Inhalation	Measured at L	3.0 Respirable & 10 mg/m3 Inhalable	TLV
		mg/m3	TWA	Inhalation	Measured at L		TLV
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL

General Comments

Monitoring will be performed to evaluate the efficacy of respiratory protection. Monitoring and analysis will be per NIOSH 7500 and utilizing hand-held, real time instrumentation when possible. CONTACT THE HEALTH AND SAFETY TECHNICIAN TO SCHEDULE AIR MONITORING.

Emergency Procedures

Specify emergency measures, if applicable:

Continuation Section

Prejob Briefing/Worker Acknowledgment:

—

I have read the requirements on this Hazard Assessment and discussed the job with Hazards Control personnel. I understand and accept my responsibilities to safely carry out this operation.

Name	Signature	Employee #	Date

Hazard Assessment and Control Form

This document summarizes key hazards and controls needed to perform work including, in some cases, specific respirators to be used. **This document is *not* a work authorization.**

File name: B419_Sampling_05_2010_r3		Prep/Last rev. Date(s): 06/15/2010
Prepared by (list all): Miguel Castro	Discipline reviewed by (list all): R. Sutay	Expiration Date: 11/30/2010

Operation Description

Building: 419	Room/Area: Indoor Areas		IWS/Authorizing document: 15672; 1345
ES&H Team: 2	Program: ERD D&D Team		Operation Start Date: 05/24/2010
RI (also list supervisor, if needed): Valerie Morrow	Employee No(s). 627406	Phone/Page No(s). 2-9246	
Operation: Sampling of B419 indoor areas for characterization purposes. Access into building.		Hours/Day: 6	Days/Year: 180

Overall Operation Description:
Workers will access building to conduct characterization sampling using hand tools, electric core drill and roto-hammer. Additionally workers may also access building in order to conduct physical integrity inspections.

Personnel

Personnel Involved — See IWS ☒ See following list ☐:

Name(s) (Use Continuation Section if >20 people are involved)	LLNL Employee No.	Job Category Code

Comments: See IWS 15672 & 1345 for list of authorized workers.

Respiratory Protection

Air Purifying Respirators:

Activities: Describe work in each phase/activity in enough detail to justify respirator selection and avoid confusion with other activities.			
	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
	Description of work: HCD Sampling/Access	Description of work: RHWM Sampling	Description of work:
Filter/Cartridge Type	☐	☐	☐
P100/HEPA	☒	☒	☐
Other:	☐	☐	☐
Configuration	☐	☐	☐
PAPR tight fit	☒	☒	☐
Other:	☐	☐	☐
Frequency of respirator exchange (if not after eight hours that can be spread over up to five work days; also provide cartridge changeout schedule):	When resistance becomes noticable or if cartridge becomes contaminated	When resistance becomes noticable or if cartridge becomes contaminated	
OK to reuse filter? No *Dispose of filter as HW and clean masks before return?* Yes. Note decontamination instructions in the following "Comments" section. *Used in beryllium work area or for activities that may involve beryllium exposure?* No For filtering facepiece respirators only: *Is this respirator being used to prevent allergic reactions?* No *Is this respirator being used for personal comfort/preference?* No			
Comments:			

Air Supplied Respirators

	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
Operating Type	☐	☐	☐
Constant flow	☐	☐	☐
Pressure demand	☐	☐	☐
Type	☐	☐	☐
Abrasive blaster's hood	☐	☐	☐
Other:	☐	☐	☐
Air source/location			
Comments:			

Issue Point Administrator		Badge No.	
Issue Point Location			

Other PPE

Personal Protective Equipment:

For engineering controls - see IWS ☒ See the IWS and this section of the HAC ☒ See this section ☐			
	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
Eye protection	☐	☐	☐
Garments	☒ Disposable coverall suit	☒ Disposable coverall suit	☐
Gloves	☒ Double nitriles	☒ Double nitriles	☐
Head protection	☒ Hard hat	☒ Hard hat	☐
Hearing protection	☐	☐	☐
Safety shoes	☒ Stout work boots/shoes	☒ Stout work boots/shoes	☐
Shoe covers	☒ Integral to coverall	☒ Integral to coverall	☐
Other PPE controls	☐	☐	☐
Comments:			

Engineering Controls

For engineering controls - see IWS ☒ See the IWS and this section of the HAC ☐ See this section ☐			
	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
Eyewash/Shower	☐	☐	☐
Glovebox	☐	☐	☐
Hood/fan number	☐	☐	☐
Interlocks	☐	☐	☐
Portable ventilation	☐	☒ HEPA vaccum	☐
Other engin. controls	☐	☐	☐
Comments: RHWM shall use HEPA exhausted local ventilation (i.e. HEPA vacuum) when taking bulk samples.			

Administrative Controls

For administrative controls - see IWS ☒ See the IWS and this section of the HAC ☐ See this section ☐			
	Phase/Activity1	Phase/Activity 2	Phase/Activity 3
Training Requirements:			
Respirator-related	☒ HS4610	☒ HS4610	☐
HAZCOM-related	☐	☐	☐
Posting/labeling	☐	☐	☐
HHC Poster	☐	☐	☐
Other signs/labels	☒ Post area as Radiological Buffer Area	☒ Post area as Radiological Buffer Area	☐
Other admin. controls	☒ HS6340 or equivalent	☒ HS6340 or equivalent	☐
Medical surveillance? Respirator: ☒ Hearing protection: ☐ Other: ☒ Per IWS 15672/1345 requirements.			
Comments:			

Additional Control Requirements

(Use Continuation Section if there are more than 10 comments)

Hazard Evaluation

Hazard(s): Previous sampling within buildings showed discrete areas with moderate radiological contamination. Exposure from sampling and inspection activities are expected to be below levels of concern. Airborne radioactive contamination is not expected. Respirators are worn prophylactically as requested by the RI.

Potential for: Confined space entry ☐ Permit confined space entry ☐ Oxygen deficiency ☐ IDLH ☐

Assign a number to each agent. Assign a lower-case letter after each number if more than one route of exposure is possible.

#	Agent(s) (Use Continuation Section if >10 agents are involved)	Exposure Level	Exposure Limit Type	Route(s) of Exposure	Evaluation Type	Current OEL	OEL Source
	Various rad mat	< 1 DAC- hr Other (use Con	DAC	Inhalation	Professional ju	2000 DAC-hrs	Other (use Co
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL
		mg/m3	TWA	Inhalation	Measured at L		OSHA PEL

General Comments

Emergency Procedures

Specify emergency measures, if applicable:
Workers shall contact Fire Department for emergencies.

Continuation Section

Radiological exposure limits set forth in 10 CFR 835, "Occupational Radiation Protection." 5-rem/y limit is equivalent to 2000-DAC-h.

Pre-job Briefing/Worker Acknowledgment:

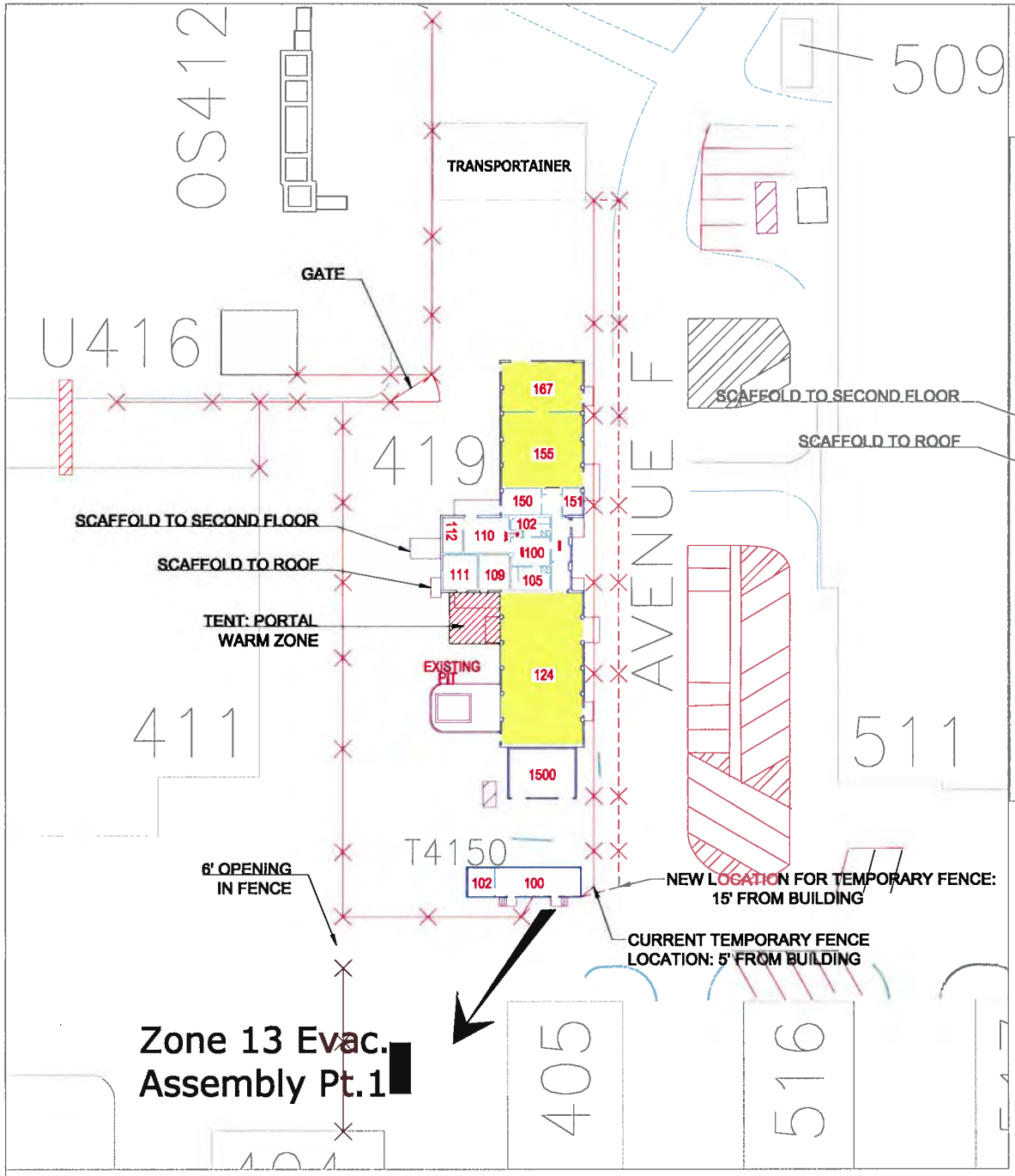
Required

I have read the requirements on this Hazard Assessment and discussed the job with Hazards Control personnel. I understand and accept my responsibilities to safely carry out this operation.

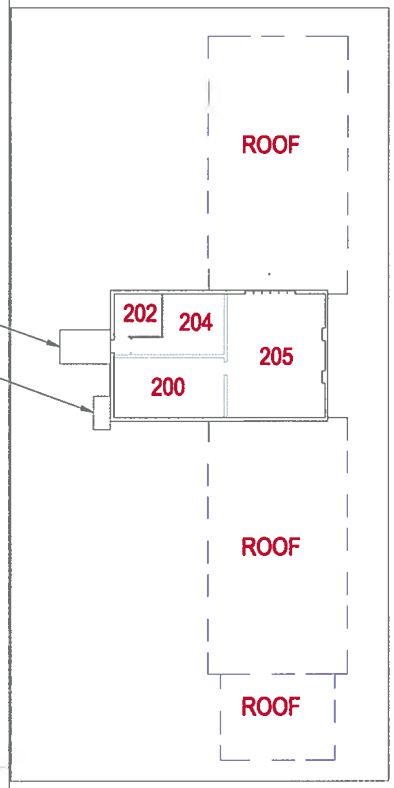
Name	Signature	Employee #	Work Restriction (Y/N)	Date

Enclosure 5

Drawing of Project Site Showing Transition Areas



N B-419 FLOOR 1, T 4150 D&D
SCALE 1"=15'



N B-419 FLOOR 2
SCALE 1"=15'

LEGEND

- RCRA
- WARM ZONE
- TEMPORARY FENCE LINE
- TEMPORARY DEMO FENCE LINE

CLASSIFICATION: CLASSIFICATION

US STANDARD

THIS DRAWING WAS CREATED BY THE LAWRENCE LIVERMORE NATIONAL SECURITY, LLC (LLNS) WHICH OPERATES LAWRENCE LIVERMORE NATIONAL LABORATORY (LLNL) FOR THE U.S. DEPARTMENT OF ENERGY UNDER CONTRACT NO. DE-AC52-07NA27344. ANY REPRODUCTION, DISSEMINATION AND/OR FABRICATION IS PROHIBITED WITHOUT THE PERMISSION OF COGNIZANT LLNS PERSONNEL.

LAWRENCE LIVERMORE NATIONAL LABORATORY
LIVERMORE, LIVERMORE NATIONAL SECURITY, LLC

TITLE: D&D DEMO PLAN B-419 & T4150

SIZE: | CAGE CODE: 14067 | DWG NO | REV

SCALE: 1"=15'

Environmental Protection Department, **Lawrence Livermore National Laboratory**
P.O. Box 808, L-627, Livermore, California 94551

Appendix E

Copies of Permits

Lawrence Livermore National Laboratory

July 21, 2010

Ms. Denise Thompson
Asbestos Notification Department
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Subject: *Renovation Notification for the Building 419 RCRA Asbestos Renovation Project Asbestos Removal, Plant 255, Lawrence Livermore National Laboratory*

Dear Ms. Thompson:

Please find enclosed the completed Renovation form as notification for asbestos removal during the Building 419 (B419) RCRA Asbestos Renovation Project. Also enclosed is Lawrence Livermore National Laboratory (LLNL) Check Number 770098 for the associated $1,021 asbestos removal operation fee. The completed Renovation form reflects the removal of wall board, joint compound, skim coat, pipe insulation (including pipe elbows), packing insulation, friable transite board, and miscellaneous debris (including asbestos contaminated plastic and personal protection equipment [PPE]) as Regulated Asbestos Containing Materials (RACM) that will occur throughout the entire building. Included with the Renovation form is an overall abatement estimate for the square footage, linear footage, and cubic footage of RACM that will be removed during this project.

If you have any questions regarding this notification, please contact Mr. Steve Cerruti at (925) 422-3006. In addition, please forward your *Acknowledgement of Notification and Payment of Fees* to Mr. Cerruti at the following email address: cerruti2@llnl.gov

Sincerely,

Sav Mancieri

Sav Mancieri, Division Leader
Permits and Regulatory Affairs Division
Environmental Protection Department

Enclosures:
1. BAAQMD Renovation Notification Form
2. Abatement Estimate
3. LLNL Check No. 770098

PRAD10-178 / EPDAI10-167 – SM/SC:IH

Recycle
7600-61230

RENOVATION
REGULATION 11, Rule 2

Notification Form

For Office Use Only
J# _____
I# _____

Site of Renovation
Notification must be submitted with payment

Site Address: 7000 East Avenue Cross Street: Vasco Road
City: Livermore Zip: 94550 Phone (925) 422-1100
Owner/Operator Depart. of Energy/LLNS,LLC - LLNL Specific Location: B419 RCRA Asbestos Renovation Project
Check One: ☐ Single-Family Dwelling ☐ Owner-Occupied Condominium ☐ Multifamily Dwelling ☐ Commercial ☒ Govt Bldg ☐ School

Contractor/Individual Performing Renovation

Name: Company/Individual Lawrence Livermore National Laboratory*** Contact: Joseph Albert
Mailing Address: P.O. Box 808, L-442
City: Livermore Zip: 94551 Phone: (925) 423-0149
Have you previously submitted notifications for other sites? ☒ Yes ☐ No

Description of Renovation

☒ Renovation ☐ Planned Renovation (attach work schedule) ☐ Cumulative Renovations (each < 100 sq or lin ft).
Material Description: Wall Board, Joint Comp., Skim Coat, Transite Board, Pipe Insulation/Elbows, Misc. Debris
Method(s) of Removal: * WET
Total removal amounts ** of ***friable*** asbestos material only: 889 lin ft *OR* 1470 sq ft *OR* 35 cu ft

* If method is Dry Removal, attach a letter to this form requesting conditional approval for dry removal. (Dry removal includes, but is not limited to, shot/bead blasting of mastic.)
** Indicate how much of this, if any, involves dry, bead blast, or shot-blast removal: _____

Dates of Renovation: (Actual dates must be entered, ***"ASAP"*** or "***Soon***" will be rejected.)
Start Date: 8/9/10 Completion Date: 9/15/10 ☒ Weekend Work ☒ Night Work *(After 5 PM)*

Waste Transporter Information

Name: Hittman Transportation Services EPA ID# TND987783065
Address 628 Gallaher Road
City Kingston, TN Zip: 37763
Contact: Karen Kirby Phone (865) 376-8100

Disposal Site Information

Landfill Name: EnergySolutions LLC.
Address: Interstate-80, Exit 49
City: Clive
State: UT Zip: 84029

Emergency Renovation Only

Date of Emergency: _____ Time: _____ Description of event and an explanation of how the event has caused unsafe conditions or would cause equipment damage: _____

Form Preparation Information

This form prepared by: Joseph Albert Title: Craft Supervisor
Name: Company/Individual LLNL Phone: (925) 423-0149
Address: 7000 East Avenue (P.O. Box 808, L-442) City: Livermore State: CA Zip: 94550

See Page Two to Complete This Form

***Please Email a copy of the Job# (i.e., *Acknowledgement of Notification and Payment of Fees*) to Steve Cerruti at cerruti2@llnl.gov.

Required Information

Payment must be received before J# will be assigned. See Schedule L of Regulation 3 for appropriate fees.

Payment type: ☐ Cash ☒ Check ☐ Money Order ☐ Credit Card (*Visa, MasterCard Only*)

(payments, other than credit card payment, must be mailed or delivered to: 939 Ellis St., San Francisco, CA 94109)

I certify that an individual trained in the provisions of Regulation 11, Rule 2, will be on site during the renovation and evidence that the required training has been accomplished by this person will be available for inspection during normal business hours.

Signature of Contractor or Person Performing Renovation: Joseph Allen

I certify that the above information is correct and that I will comply with all of the requirements of the BAAQMD's regulations, as well as all other applicable federal, state and local requirements.

Signature of Contractor or Person Performing Renovation: Joseph Allen

Form: 1102_renov04_052108

GENERAL INFORMATION

- This notification form shall be used to notify the BAAQMD of asbestos removal (**renovation**) operation only. Notification is required for each renovation where the amount of Regulated Asbestos-Containing Material (RACM) is greater than or equal to 100 square/linear feet, or for <u>any</u> dry removal. <u>All boxes must be completed</u>. <u>Appropriate fee payment must accompany each notification</u>. Notifications may be faxed to (415) 749-4658, but job numbers will not be issued unless accompanied by a valid credit card authorization or until a valid check, cashier's check or money order for applicable fees is received.
- Notification shall be provided to the District at least 10 working days prior to commencement of renovation, or as early as possible prior to commencement of emergency renovation. <u>The notification period will not start until a complete notification is submitted</u>.
- An Acknowledgement Letter is mailed to the contractor/individual listed within 3 days of receipt of a complete notification. This should be checked for accuracy of data.
- If the job is postponed or cancelled, the District **<u>must</u>** be notified by a revision; the Acknowledgement Letter should be used to fax or mail the revision information. When cancelled, a cancellation fee will apply.
- For specific "Emergency" conditions, the 10 working day period will be waived. Notification must be made by fax and the job number will be issued if accompanied by a valid credit card authorization form, or a faxed copy of a valid check or money order.
- For residential structures with 4 or fewer units, the 10 working day period may be reduced to 72 hours for an additional fee.

INSTRUCTIONS

- **SPECIFIC LOCATION OF PROJECT**: Identify where the renovation is taking place if the site contains more than one building, or if the building has multiple floors.
- **START AND COMPLETION DATES**: The start date is the date on which removal commences. Any revision to the start or completion dates must be submitted prior to the previously notified date(s). Under no circumstances may the revised start date be earlier than the 10th working day following the postmark or fax date of the original notification. If the start date is unknown, enter an estimated start date and revise the notification when the actual start date is known, but not later than the estimated start date.
- **MATERIAL DESCRIPTION**: Indicate the type of RACM being removed, e.g., pipe lagging, acoustical ceiling, thermal system insulation, asbestos insulated heating ducts.
- **METHODS OF REMOVAL**: Indicate the methods and procedures you will use to comply with the standards in Reg. 11-2. If the method involves dry removal, follow the instructions on the form.
- **REMOVAL AMOUNT**: Indicate the amount of RACM to be removed. If the job involves wet and dry removal, indicate the total for both. Indicate how much of this total amount involves dry removal on the line marked **. Non-friable asbestos removal is exempt from notification unless it is made friable during renovation activity.
- **DISPOSAL SITE INFORMATION**: Indicate the name of the disposal site where the RACM will be deposited.
- **WASTE TRANSPORTER INFORMATION**: Indicate the name of the transporter of RACM. The State of California considers RACM a hazardous waste, therefore, a contractor is required to obtain an EPA number (ID#) to qualify as a waste hauler.

ATTACHMENT

RACM Abatement Estimate for the Building 419 RCRA Asbestos Renovation Project

***Total Regulated Asbestos Containing Material (RACM) Removal**

Wall Board/Joint Compound/Skim Coat	approximately 1330 square feet
Friable Transite Board	approximately 120 square feet
Packing Insulation	approximately 20 square feet
Pipe Insulation (including Pipe Elbows)	approximately 889 linear feet
Miscellaneous Debris (Contaminated Plastic, etc.)	approximately 35 cubic feet

Tentative location in which removal is anticipated:
Building 419 – Entire
Areas/Rooms include: Mezzanine, Roof, Rm 102, Rm 104, Rm 105, Rm 109, Rm 111, Rm 124, Rm 155, Rm 167, Rm 200, Rm 204, Rm 205.

*Note: This above estimate is based on sample data currently available. Further bulk sampling may be required to better characterize building materials associated with this Project. If additional RACM or potential RACM is found before the Project starts, the District will be notified. Fees have been paid for RACM removal up to 2500 linear feet and 2500 square feet, and greater than 35 cubic feet.

View LLNL purchase order payment data online at https://apqry.llnl.gov/vipir/

CHECK NUMBER 770098 DATE 19-JUL-10 VENDOR NUMBER 634

PURCHASE ORDER NUMBER	INVOICE NUMBER	INVOICE DATE	DESCRIPTION	DISCOUNT AMOUNT	NET AMOUNT
0528619	PR00528619	15-JUL-10	PRAD10-178	0.00	1,021.00

LAWRENCE LIVERMORE NATIONAL LABORATORY TELEPHONE (925) 424-5239 CHECK AMOUNT $1,021.00

REMOVE DOCUMENT ALONG THIS PERFORATION

THIS DOCUMENT CONTAINS A WATERMARK — HOLD TO LIGHT TO VIEW.

Lawrence Livermore National Laboratory
ACCOUNTS PAYABLE OFFICE
P.O. BOX 5001
LIVERMORE, CA 94551-5001
TELEPHONE (925) 424-5239

96-651
1232
Canby, OR

CHECK NUMBER 770098
DATE July 19, 2010

PAY TO THE ORDER OF

BAAQMD*
BAY AREA AIR QUALITY MGMT DISTRICT

PAY EXACTLY********1,021.00*DOLLARS 00 CENTS

$1,021.00
Void after one year

VOID VOID VOID

usbank
Five Star Service Guaranteed

Linda M. Rakow
Kathy R. Baker

⑈0000770098⑈ ⑆123206516⑆ 153210000763⑈

BAY AREA AIR QUALITY MANAGEMENT DISTRICT	COMPLIANCE & ENFORCEMENT DIVISION	*Regulation 11, Rule 2*
		Acknowledgement of Notification and Payment of Fees

7/26/2010

Lawrence Livermore National Laboratory
P.O. Box 808, L-442
Livermore, CA 94551

J#: **3L152**
Invoice No : **2MU34**

The Bay Area Air Quality Management District (BAAQMD) acknowledges receipt of your payment and your Asbestos Removal or Demolition Plan described as: **Demolition**

Site address 7000 East Ave
Livermore, CA 94550

Start Date September 15, 2010
Completion Date October 15, 2010

Removal amounts of friable ACM 0 linear feet 0 square feet 0 cubic feet

Should it become necessary to revise this plan, please do so in the spaces provided below and immediately copy the District by fax or by mail.

REGULATION 11-2 REVISION	BAAQMD **J# 3L152**

REVISION #	START DATE	COMPLETION DATE
1	10 / 1 / 10	11 / 15 / 10
2	10 / 22 / 10	12 / 15 / 10
3	11 / 22 / 10	12 / 31 / 10
4	11 / 29 / 10	/ /
5	/ /	/ /

NOTE: *This form is not intended as a verification of either the completeness of your original notification or of its compliance with BAAQMD Regulation 11-2. If you have any questions about this acknowledgment, please call our office at (415) 749-4762.*

November 29, 2010

Ms. Denise Thompson
Asbestos Notification Department
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Subject: *Change of Hazardous Waste Transporter for Job# 3L153 - The Building 419 RCRA Asbestos Renovation Project, Plant 255, Lawrence Livermore National Laboratory*

Dear Ms. Thompson:

Please be advised that Lawrence Livermore National Laboratory (LLNL) intends to change the hazardous waste transporter that was initially identified on the Renovation Notification Form for the *B419 RCRA Asbestos Renovation Project.* The Project was issued the Bay Area Air Quality Management District (BAAQMD) Job# 3L153. LLNL intends to use the hazardous waste transporter identified below. Provided below, is the required "Waste Transporter Information" for the new hazardous waste transporter.

Waste Transporter Information

Name:	Visionary Solutions, LLC	**EPA ID#**	NMR000013086
Address:	111 Union Valley Road, Suite B		
City:	Oak Ridge (Tennessee)	**Zip:**	37830
Contact:	Jim Mowrey	**Phone:**	(865) 482-8670

If you have any questions regarding the subject matter, please contact Mr. Steve Cerruti at (925) 422-3006.

Sincerely,

Gretchen Gallegos, Group Leader
Water, Air, Monitoring, and Analysis
Environmental Functional Area

WAMA10-046/ AI10-251 – GG/SC:jk

Recycle
7600-61230

Appendix F

Example Copies of the COC and Log Books

B419 Phase II Soil/Borehole B-419-051 (B-419-R167-006)

WLM
8/23/2011

Sample I.D	Date/Time	LAB	Analysis	TAT	Matrix/Container	GC#
B-419-051-1F	8/23/11/10:52	ALS	Standard	20d	SO/7G	54047
Trip Blank	↓ ↓	↓	W-8260	↓	B/W	↓
B-419-051-1F			Cont		SO/2G	54048
B-419-051-5F	8/23/11/1105	ALS	Standard	20d	SO/7G	54049
Trip Blank	↓ ↓	↓	W-8260	↓	BW/V	↓
B-419-051-5F			Cont		SO/2G	54050
B-419-051-10F	8/23/11:21	ALS	Standard	20d	SO/7G	54051
Trip Blank	↓ ↓	↓	W-8260	↓	BW/V	↓
B-419-051-10F			Cont		SO/2G	54052
B-419-051-15F	8/23/1132	ALS	Standard	20d.	SO/7G	54053
Trip Blank	↓ ↓	↓	W-8260	↓	BW/V	↓
B-419-051-15F			Cont.		SO/2G	54054

Standard suite soil samples shipped overnight to ALS, 8/24/2011
Contingency suite soil samples shipped ground to ALS, 8/25/2011
Account number, 33824-B419-3.3

EXAMPLE

Chain of Custody

Attn: ERD Data Management Team
Lawrence Livermore National Laboratory
P.O. Box 808 L-542
Livermore, CA 94551

Work Authorized By: PETE MCKEREGHAN
TRR Approver: SUSAN LAMBAREN
Project Info:

Access/COC #: 54047
Document Control #: MA2071
Requester/LLNL Analyst: LGIV
Organization / Sampler: ERD / mcconihe1
PCI Project #: 33824
PCI Task #: B419.3.3
Fax/Email #1: morrow3@llnl.gov
DMT Additional Copies:

Analytical Lab : ALS-PARAGN
TAT: 20d
Analytical Lab Log #:
Project/Network: B419SOIL
LLNL Acct #: 33824
Release #: 150785
Fax/Email #2: salvo1@llnl.gov

Additional Instructions:
Hold TCLPEX for semi-volitiles, PET hydrocarbons and PCB's until further instructions are provided

Sample ID	Sampled Date/Time	Matrix	Cont. Type	Cont. Count	Study Area	Req. Analysis	Analysis Detail	Lab Instructions
B-419-051-1F	08/23/2011 10:52	SO	P	1	419	3060A-7196	ALL	
B-419-051-1F	08/23/2011 10:52	SO	GL	1	419	419ORGTCLP	ALL	
B-419-051-1F	08/23/2011 10:52	SO	GL	1	419	E8270	ALL	
B-419-051-1F	08/23/2011 10:52	SO	G	0	419	E9010	ALL	
B-419-051-1F	08/23/2011 10:52	SO	O	0	419	E906EPSM	ALL	
B-419-051-1F	08/23/2011 10:52	SO	S	0	419	E9310	ALL	
B-419-051-1F	08/23/2011 10:52	SO	G	0	419	EM8015	DIESEL	
B-419-051-1F	08/23/2011 10:52	SO	G	0	419	EM8015	GAS	
B-419-051-1F	08/23/2011 10:52	SO	G	0	419	TCLPEX	ALL	
B-419-051-1F	08/23/2011 10:52	SO	P	0	419	TTLCMET	ALL	
B-419-051-1F	08/23/2011 10:52	SO	G	0	419	W8082PLUS	ALL	
B-419-051-1F	08/23/2011 10:52	SO	GL	3	419	W8260	ALL	Analyze 5035 by W8260
TRIPBLANK	08/23/2011 10:52	BW	GL	1	419	W8260	ALL	Run only if hit

SHIPPED
SEP 24 2011

EXAMPLE

Relinquished Signature	Company	Date	Time	Received Signature	Company	Date	Time
1	LLNL/ERD	8/24/2011		2			
2				3			
3				4			
4				5			

Revision Printed: 10/29/2010/16/03/03

Signature Order - 1: Sampler, 2: Courier, 3: Lab, 4: Analyst, 5: DMT

270797

LLNL **LLNL**

Document Control # MA2071	**Sample ID** B-419-051-1F
Lab ALS-PARAGN	**Release #** **Sample Method** 150785 NA
Project B419SOIL	**Date/Time** 23-Aug-2011 10:52
Sampler mcconihe1	**Preservative / Volume/Flowrate**
Requested Analysis 419ORGTCLP:ALL	

EXAMPLE

270720

LLNL **LLNL**

Document Control # MA2071	**Sample ID** B-419-051-1F
Lab ALS-PARAGN	**Release #** **Sample Method** 150785 NA
Project B419SOIL	**Date/Time** 23-Aug-2011 10:52
Sampler mcconihe1	**Preservative / Volume/Flowrate**
Requested Analysis 3060A-7196:ALL	

EXAMPLE

270731

LLNL **LLNL**

Document Control # MA2071	**Sample ID** B-419-051-1F
Lab ALS-PARAGN	**Release #** **Sample Method** 150785 NA
Project B419SOIL	**Date/Time** 23-Aug-2011 10:52
Sampler mcconihe1	**Preservative / Volume/Flowrate** Cool 4, deg. C
Requested Analysis E8270:ALL	

EXAMPLE

270721

LLNL **LLNL**

Document Control # MA2071	**Sample ID** B-419-051-1F
Lab ALS-PARAGN	**Release #** **Sample Method** 150785 NA
Project B419SOIL	**Date/Time** 23-Aug-2011 10:52
Sampler mcconihe1	**Preservative / Volume/Flowrate**
Requested Analysis W8260:ALL	

EXAMPLE

Appendix G

Bore Hole Logs

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

B-419-001

B419

N

(2) Project: LLNL / Building 419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-001

(4) Job No.: 33824 - B419.3.3

(5) Logged By: William McConiho

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Marrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling, Martinez CA

(10) Driller/Helper: Armando Torres / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand-auger & Direct push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch Final: 3 3/4-inch

(16) Borehole Started, Time/Date: 12:15 8/9/2011

(17) Borehole Completed, Time/Date: 13:00 8/9/11

(18) Water Source: B419 hyd

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16 feet

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A

(29) Circulation: N/A

By: — Date —

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
												Concrete	(0-0.5) Concrete ⌐0.5
		HA to 3.0'				1F (12:25)				1		Gravel	(0.5-0.8) Gravel, (G), gray pea gravel base. ⌐0.8'
						2F (12:38)				2		Silty Clay	(0.8-6.8) Silty Clay (CL), yellow brown (10YR 4/3) med, moist, low plasticity trace vf-m sand, LEK.
		DP 3.0'		1.0 / 1.0				Type II-V Portland Cement Grout		3			@ 3.1 ft, trace SA gravels o0.5 inch.
		DP to 4.0'		3.75 / 4.0						4			⌐6.8'
						5F (12:53)				5			(6.8-16) Gravelly Sand, (SW) yellow brown, (10YR 4/4) dense, moist, vf vc grained, 20-30% SA-SR gravels to 1.1/2 inches, 5% fines, MEK.
										6			
										7			
										8		Gravelly Sand	
		DP to 8.0'		3.7 / 4.0						9			@ 8-8.7 ft, Sandy silt interbed, tight.
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded, RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact
						+10F (10:35)		Type II-V Portland Cement Grout				
										1		
										2	NR	
		DP to 16'		2.9/4.0						3		Gravelly Sand
										4		
						-14.5F (13:15)				5		
										6	NR	
										7		
										8		
										9		
										0		
										1		
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										0		

(2) Project: LLNL/ Building 419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-001

Notes:

Gravelly Sand (SW), cont'd.

T.D. = 16.0 feet

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

(2) Project: LLNL B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-002

(4) Job No.: 33924-B419.3.3

(5) Logged By: Will McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL MZ.5 DP

(9) Drilling Contractor: Gregg Drilling, Martinez, CA

(10) Driller/Helper: Armando Torres / Richard Ryan

(11) Drilling Method: Direct Push

(12) Sample Method: Hand-auger & Direct Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch Final: 3 3/4-inch

(16) Borehole Started, Time/Date: 8:45 / 8/10/2011

(17) Borehole Completed, Time/Date: 9:30 / 8/10/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 feet

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Soil core had 0 mg/cm³ with Hg sniffer and had α, β and gamma at background levels
												Concrete	(0-0.5) Concrete slab
		HA to 3.0'				-1F (8:50)		Type II+V Portland Cement Grout		1		Gravel	(0.5-1.1) Gravel (GP) pea gravel base rock — 1.1'
						-2F (9:02)				2		Sandy Silt	(1.1-3.5) Sandy Silt (ML), lk grayish brn (2.5Y 4/2), soft, moist, 15-25% vf-m sand, crumbles, LEK, decreases silt with depth below 3 ft. — 3.5
		DP to 4.0'		1.0 / 1.0						3			
		DP to 8.0'		4.0 / 4.0						4		Clayey Silt	(3.5-4.6) Clayey Silt (ML), yl brown (10YR 4/3), med. dens, lo vf-f sand, LEK — 4.6
						-5F (9:20)				5		Gravelly Silt	(4.6-13.9) Gravelly Sand (SM) lo brown (10YR 4/3), med. dense vf-vc grained, SA-SR gravels ½ inches, 10-15% fines, L-MEK.
										6			
										7			
										8			
		DP to 12.0'		4.0 / 4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-002

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (9:33)		Portland Cement Grout		0			Gravelly Sand (SM), cont'd.
										1		Gravelly Sand	
										2			13.9
		DP to 16'		3.6/4.0						3			(13.9 – 16.0) Silty Clay (CL), yellow brown, (10YR 5/4), moist, damp, low plasticity, Mn O2 specks, tight, LFK.
										4			
										5		Silty Clay	
						-15F (9:45)				6	NR		
										7			T.D. = 16.0 feet
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N ↑ •—B-419-003

B419

B511

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-003

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConike

(6) Edited By: Mark Buschbeck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling Martinez, CA

(10) Driller/Helper: Armando Torres / Richard Ryon

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand-auger + Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch to 3ft. Final: 2 1/4-inch; 3-16 ft

(16) Borehole Started, Time/Date: 10:07 / 8/9/2011

(17) Borehole Completed, Time/Date: 11:07 8/9/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(21) Well Head Completion: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

Notes: Soil core had 0mg/cm³ with Hg sniffer and had α, β and gamma at background levels

ABBREVIATIONS: ------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A

(29) Circulation: N/A

By: — Date —

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Core		0.5/0.5				Type II-V Portland Cement Grout				Concrete	(0-0.5) Concrete slab — 0.5
		HA to 3.0		2.5/2.5		-1F (10:10)				1		Base rock / Sand	(0.5-1.0) Gravel (GP) Pea gravel base rock
						-2F (10:20)				2		Gravelly Sand	(1.0-1.3) Sand, SP, very pale brown (10YR 7/2), med, damp, f m grained MEK. — 1.3'
		DP to 4.0		0.8/1.0						3			(1.3-4.5) Gravelly Sand (SM/SP) light olive brown (2.5Y 5/3), med, moist, vf-vc grained, 15-25% SR gravels to 1.25 ind, 5% fines. — 4.5'
		DP to 8.0'		2.5/40		-5F (10:35)				5		Clayey Silt	(4.5-5.8) Clayey Silt, (ML) brown, (10YR 4/3), med, damp, low plasticity MEK — 5.8'
										6		Gravelly Sand	(5.8-16.0) Gravelly Sand, (SW) brown (10YR 5/3), med, damp, vf-vc grained, 15-25% SR grav 3/4 inch, trace silt, MEK;
										7	NR		
										8			
		DP to 12.0'		2.2/4.0						9			@9ft, very tight.
						-9.5F (10:55)				10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact
								Type II-V Portland Cement Grout		10	NR	Gravelly Sand
										11		
										12		
		DP to 16'		4.0 / 4.0						13		
										14		
										15		
						-15F (11:05)				16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation.

(3) Borehole/Well No.: B-419-003

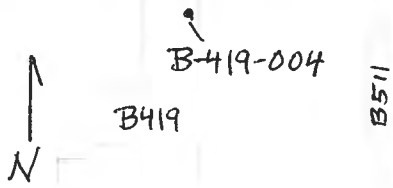
Notes:

Gravelly Sand (SW), cont'd

T.D. = 16.0 ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project:	LLNL, B419 RCRA Closure Phase II Soil Investigation
(3) Borehole/Well No.:	B-419-004
(4) Job No.:	33824-B419.3.3
(5) Logged By:	Will McCanlie
(6) Edited By:	Mark Buscheck
(7) Project Manager:	Valerie Morrow
(8) Drill Rig:	MARL M2.5 DP
(9) Drilling Contractor:	Gregg Drilling, Martinez, CA
(10) Driller/Helper:	Eric Santellan / Rick Ryan
(11) Drilling Method:	Direct-Push
(12) Sample Method:	Hand-auger + Direct-Push
(13) Hammer Weight/Drop:	N/A
(14) Bentonite Gel Used:	N/A
(15) Borehole Diameter, Pilot:	3 3/4-inch, 0.6-3'
Final:	2 1/4-inch, 3'-16'
(16) Borehole Started, Time/Date:	9:51 8/29/2011
(17) Borehole Completed, Time/Date:	10:40 8/29/11
(18) Water Source:	B419 area hydrant
(19) Well Started, Time/Date:	No well installed
(20) Well Completed, Time/Date:	N/A
(21) Well Head Completion	N/A

Notes: Soil core had readings of 0 mg/cm³ with Hg snifter and α, β and gamma at background levels.

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth:	16.0 ft
(24) Casing Depth:	N/A
(25) Screened Interval:	N/A
(26) Sand Pack, #3	N/A
#0/30:	N/A
(27) Well Development Method:	N/A
Time:	—
Date:	—
Flow Rate:	—
(28) Geophysical Logs, Type:	N/A
By:	—
Date	—
(29) Circulation:	N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Slurry concrete 4" thick pour on top of concrete
		Concrete Core		0.6/0.6				Type II-V Portland Cement Grout				Concrete	(0-0.6) Concrete slab 0.6
		HA to 3.0'		2.4/2.4		1F (9:56)				1		Sand	(0.6-1.5) Sand (SP), yellow (10YR 7/6) med, damp, vf-m grained, L-MEK. 1.5
						2F (10:05)				2		Sandy Silt	(1.5-3.6) Sandy Silt (ML), brown (10YR 4/3), firm, damp, 15-20% vf-f Sand, LEK.
		DP to 4.0'		1.0/1.0						3			3.6
		DP to 8.0'		1.8/4.0						4		Gravelly Sand	(3.6-16.0) Gravelly Sand (SW/SM), yellow brown (10YR 5/4), med, damp, vf-vc grained, 10-20% SA-SR gravels to 1 3/4-inch, 5% fines, L+MEK.
						5F (10:18)				5			
										6	NR		@5.9ft, large gravels blocks off shoe.
										7			
										8			
		DP to 12.0'		3.1/4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity, 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite, CIF = coring induced fracture, cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core, RQD = rock quality description, rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

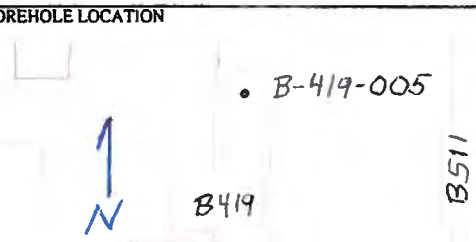
(3) Borehole/Well No. B-41

Notes:

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
						-10F (10:35)		Type II-V Portland Cement Grout		10		Gravelly Sand	Gravelly Sand (SW/SM), cont'd.
										11			
											NR		
		DP to 12'		4.0 / 4.0						12			
										13			
										14			
										15			
						-15F (10:45)				16			
										17			T.D. = 16.0 ft.
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-005
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M2.5DP
(9) Drilling Contractor: Gregg Drilling, Martinez, CA	
(10) Driller/Helper: Armando Torres / Richard Ryan	
(11) Drilling Method: Direct-Push	(12) Sample Method: Hand auger + Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 3 3/4 inch: 0.6-3'	Final: 2 1/4-inch: 3' to 16'
(16) Borehole Started, Time/Date: 8:20 / 8/9/2011	(17) Borehole Completed, Time/Date: 9:00 / 8/9/2011
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

Notes: Soil core had readings of 0 mg/cm³ with Hg sniffer and had α, β, and gamma at background levels

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —	(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		Concrete Coring		0.6 / 0.6				Type II + V Portland Cement Grout				Concrete	(0-0.6) Concrete slab ~0.6'
		HA to 3'		2.4 / 2.4		-1F (8:25)				1		Baserock	(0.6-1.0) Baserock ~1.0'
						-2F (8:35) -DUP-2F (8:36)				2		Gravelly Sand	(1.0-16.0) Gravelly Sand (SW/SM), light yellow brown, (10YR 6/4), med. wet, vf-vc grained, 15-25% SR gravel to 1 1/4-inch, 10% fines, LFK, wet at 1-3 feet,
		DP to 4.0'		1.0 / 1.0						3			
										4			
		DP to 8.0'		2.25 / 4.0						5			@4.8ft, increasing clay content, damp
						-5F (9:00)				6			
										7	NR		
										8			
		DP to 12.0'		4.0 / 4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-005

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
						-10F (9:18)		Type II-V Portland Cement Grout		10		Gravelly Sand.	@10' soil S 91 MG, Gravelly Sand (SW/SM), cont'd
										11			
										12			
		DP to 12.0'		3.5/40						13			
										14			
										15			
						-15F (9:30)				16	NR		
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

• B-419-006

N

B419

B511

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-006

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling, Martinez, CA

(10) Driller/Helper: Armando Torres / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand-auger + Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch : 0.5' to 3' Final: 2 1/4-inch : 3'-16'

(16) Borehole Started, Time/Date: 9:55 / 8/8/2011

(17) Borehole Completed, Time/Date: 10:30 8/8/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(21) Well Head Completion N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

Notes: Soil core had readings of 0 mg/cm³ with Hg sniffer and had α, β, and gamma at background levels

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Core		0.5/0.5				Type II-V Portland Cement Grout				Concrete	(0-0.5) Concrete slab ~0.5'
		HA to 3.0'		2.5/2.5		1F (10:00)				1		Baserock	(0.5-0.8) Baserock ~0.8'
						2F (10:10)				2		Clayey Silt	(0.8-6.2) Clayey Silt (ML), yellow-brown (10YR 4/4), med., damp, low plasticity, 10-20% vf-vc sand, trace gravels to 0.25-inch, LEK.
		DP to 4.0'		1.0/1.0						3			
		DP to 8.0'		3.2/4.0						4			
						5F (10:29)				5			
										6			~6.2'
										7		Gravelly Sand	(6.2-16.0) Gravelly Sand (SW/SM), yellow-brown (10YR 5/4), loose, dry, vf-c grained, 10-20% SA-SR gravels to 1-inch, 10% fines, MEK.
										8	NR		
		DP to 12.0		3.6/4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

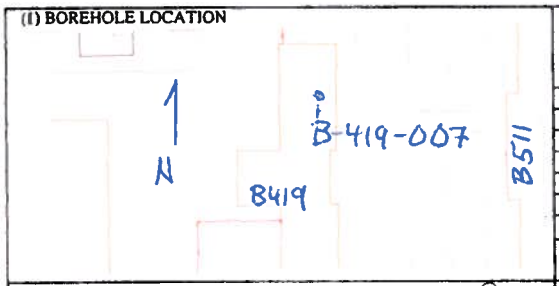
(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-006

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (10:40)		Portland Cement Grout		10			Gravelly Sand (SW/SM), cont'd
										11		Gravelly Sand	
		DP to 12.0'		3.8/4.0						12	NR		
								Type II-V		13			
										14			
						-15F (10:50)				15			
										16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-007
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M7.5 DP
(9) Drilling Contractor: Gregg Drilling, Martinez, CA	
(10) Driller/Helper: Armando Torres / Richard Ryan	
(11) Drilling Method: Direct-Push	(12) Sample Method: Hand auger & Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 3 3/4-inch: 0.5'-3'	Final: 2 1/4-inch: 3'-16'
(16) Borehole Started, Time/Date: 11:25 8/8/2011	(17) Borehole Completed, Time/Date: 12:00 8/8/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

Notes: Soil core had reading of 0 mg/cm³ with Hg sniffer and had α, β, and gamma at bkgd levels.

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date —	

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Core		0.5/0.5				Type II-V Portland Cement Grout				Concrete	(0.0-0.5) Concrete slab ~0.5'
		HA to 3.0'		2.5/2.5		-1F (11:30)				1		Silty Sand	(0.5-3.3) Silty Sand (SM), yellow-brown (10YR 4/4), med, damp, vf-m grained, 20-30% silty fines, trace SA gravels to 3/4-inch, L-MEK
						-2F (11:40)				2			
										3			~3.3'
		DP to 4.0'		1.0/1.0						4		Gravelly Sand	(3.3-14.75) Gravelly Sand (SW/SM), yellow-brown (10YR 4/4), med, damp, vf-c grained, 15-25% SA gravels to 1/2-inch, 10% fines, L-MEK.
		DP to 8.0'		4.0/4.0		-5F (11:52				5			
										6			
										7			
										8			
		DP to 12.0'		3.75/4.0						9			
										10			@ 9.5 ft, SA gravels to 1.25-inch

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; Ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

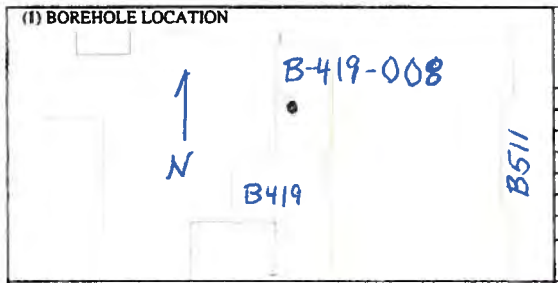
(3) Borehole/Well No.: B-419-007

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (12:03)		Type II-V Portland Cement Grout		10		Gravelly Sand	Gravelly Sand (SW/SM), cont'd
										11			
										12	NR		
		DP to 12.0'		4.0 / 4.0									
										13			
										14			14.75
													(14.75-16.0) Clayey Silt (ML), yellow-brown (10YR 4/4), stiff, damp, 10% vf-vc sand, trace SA gravels to 0.25-inch, black Mn-O specks, low plasticity, LEK.
										15		Clayey Silt	
						-15F (12:15)				16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: The numbers listed in parentheses on this log correspond to the Subsections listed in Section 6.4 of SOP 1.1 [i.e., (2) = 6.4.2, etc.].

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-008

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McLonihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5 DP

(9) Drilling Contractor: Gregg Drilling Martinez, CA

(10) Driller/Helper: Arsenio Tafrek / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand auger + Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch; 0.5'-3' Final: 2 1/4-inch; 3'-16'

(16) Borehole Started, Time/Date: 9:25 8/8/2011

(17) Borehole Completed, Time/Date: 9:06 8/8/11

(18) Water Source: B419 area hydrant

Notes: Soil core had readings of 0mg/cm³ with Hg sniffer and had α, β, and gamma at background levels.

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		Concrete Coring		0.5/0.5				Portland Cement Grout				Concrete	(0.0-0.5) Concrete slab. -0.5'
		HA to 3.0'		2.5/2.5		-1F (8:29)				1		Silty Sand	(0.5-3.6) Silty Sand (SM), yellow-brn (10YR 4/4), med, damp, vf-m grained, 15-25% fines, some clayey intervals, LEK.
						-2F (8:34)				2			
										3			
		DP to 4.0'		1.0/1.0									-3.6'
										4		Gravelly Sand	(3.6-16.0) Gravelly Sand (SM/SW), yellow-brown (10YR 4/4), med, damp, vf-c grained, 15-25% SA-SR gravels to 0.5-inch, 15% fines, L-MEK;
		DP to 8.0'		4.0/4.0						5			
						-5F (8:55)							
										6		Clayey Silt	
										7			@ 5.5-7.0 ft, clayey silt interbed, yellow-brown (10YR 4/4).
										8		Gravelly Sand	
		DP to 12.0'		3.6/4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

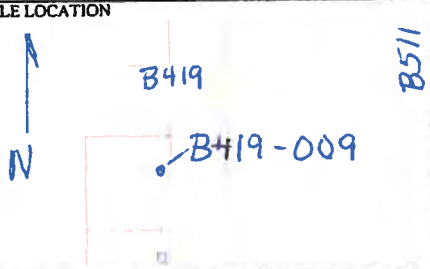
(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-008

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
										10			Gravelly Sand (SM/SW), cont'd
						10F (9:12)		Portland Cement Grout					
										11			
										12	NR	Gravelly Sand	
		DP to 16.0'		3.5/4.0									
										13			
								Type II-V		14			
										15			
						15F (9:22)				16	NR		
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-009

(4) Job No.: 33924-B419.3.3

(5) Logged By: Will McLaughlin

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Marrow

(8) Drill Rig: N/A

(9) Drilling Contractor: Gregg Drilling, Martinez, CA

(10) Driller/Helper: Vince Pokrywka / Armando Torres

(11) Drilling Method: Hand Auger

(12) Sample Method: Hand Auger

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inches Final: 3 3/4-inches

(16) Borehole Started, Time/Date: 9:50 8/22/11

(17) Borehole Completed, Time/Date: 9:05 8/22/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

Notes: Soil core had readings of 0 mg/cm³ with Hg sniffer and had α, β, and gamma at bkgd levels

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 2.5 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
		HA to 2.5'		2.5/2.5				Type II-V Portland Cement Grout		1		Asphalt	(0.0-0.3) Asphalt and gravel -0.3'
												Baserock	(0.3-1.7) Baserock, gray brn, (10YR 6/2), med, damp, SA-SR gravels 1.5 inches, 20-30% vf-vc sand, MEK. -1.7'
						2F (358)				2		Clayey Silt	(1.7-2.5) Clayey Silt (ML) brown (10YR 4/3), Med, damp, 10% vf-m sand, low plasticity, LEK.
										3			
										4			
										5			T.D. = 2.5 ft
										6			
										7			
										8			
										9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N

B-419-010

B419

B511

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-010

(4) Job No.: 33924-B419.3.3

(5) Logged By: Will McConibe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling

(10) Driller/Helper: Armando Torres / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand auger and Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 0.5'-3' Final: 2 1/4-inch: 3'-16'

(16) Borehole Started, Time/Date: 11:10 8/3/2011

(17) Borehole Completed, Time/Date: 11:45 8/3/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

Notes: Soil core had readings of 0 mg/cm³ with Hg sniffer and had α, β, and gamma at background levels.

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded, SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft (24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A (29) Circulation: N/A

By: — Date —

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
				0.5/0.5				Type II-V Portland Cement Grout				Concrete	(0.0-0.5) Concrete slab ⌐0.5
		HA to 3.0'		2.5/2.5		-1F (11:15)				1		Gravel base	(0.5-1.0) Gravel base ⌐1.0'
						-2F (11:20)				2		Sandy Gravel	(1.0-2.0) Sandy Gravel, (GM) yel-brn (10YR 5/4), med, moist, SA-SR gravels to 1.5 inches, 20-30% vf-vc, 15% fines, L-MEK. ⌐2.0
		DP to 4.0'		1.0/1.0						3		Silty Sand	(2.0-3.1) Silty Sand (SM) brn (10YR 4/3) m-d mo + vf-m grained, 10-15% fines, 5% SA gravels to 1-inch, L-MEK. ⌐3.1
		DP to 8.0'		4.0/4.0		-3F (11:30)				4		Sandy Gravel	(3.1-16.0) Sandy Gravel, as above at 1-2 feet, Olive-yel (2.5Y 6/6).
										5			
										6			
										7			
										8			
		DP to 12.0'		3.5/4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; /////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

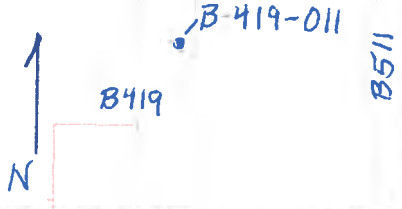
(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-010

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
						10F (11:50)		Type II-V Portland Cement Grout		10			Sandy Gravel (GM), cont'd
										11		Silty Sand	@ 10.4 - 11.15 ft, silty sand interbed
										12	NR		
		DP to 16'		3.7 / 4.0						13		Sandy Gravel	
										14			
										15			
						15F (12:06)				16	NR		
										17			T.D. = 16 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-011

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling, Martinez, CA

(10) Driller/Helper: Armando Torres / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand auger and Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 0.5'-3' Final: 2 1/4-inch: 3'-16'

(16) Borehole Started, Time/Date: 9:39 8/3/2011

(17) Borehole Completed, Time/Date: 10:15 8/3/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(21) Well Head Completion N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

Notes: Soilcore had readings of 0 mg/cm³ with Hg sniffer and had α, β, and gamma at background levels

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A

(29) Circulation: N/A

By: — Date —

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Coring		0.6/0.6				Type II-V Portland Cement Grout				Concrete	(0.0-0.6) Concrete slab. -0.6'
		HA to 3.0'		2.4/2.4		1F (9:45)				1		Silty Sand	(0.6-0.8) Gravel basecrock. -0.8'
						2F (9:55)				2			(0.8-3.9) Silty Sand (SM), yellow-brown (10YR 4/4), med, damp, vf-m grained, 10-15% fines, trace SR gravels to 0.5-inch, LEK-M. -3.9
										3			
		DP to 4.0'		1.0/1.0						4		Gravelly Sand	(3.9-16.0) Gravelly Sand (SM/SP), yellow-brown (10YR 5/4), med, damp, vf-m grained, 10-20% SA gravels to 1-inch, 10% fines, L-MEK.
		DP to 8.0'		3.5/4.0						5			
						5F (10:10)				6			
										7			
										8	NR		
		DP to 12.0'		3.7/4.0						9			@ 8 ft, vf-vc grained.
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @'= at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-41

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (10:22) -10F-DUP (10:24)		Type II-V Portland Cement Grout		10		Gravelly Sand	Gravelly Sand (SM/SP), cont'd
										11			
										12	ND		
		DP to 16.0'		36/4.0						13			
										14			
										15			
						-15F (10:30)				16	NR		
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION	SEE ATTACHED MAP
(2) Project:	LLNL S200 B419 RCRA closure
(3) Borehole/Well No.:	B-419-012
(4) Job No.:	33824 B419.3.3
(5) Logged By:	Andy Niemand
(6) Edited By:	M. BUSCHECK
(7) Project Manager:	V. Morrow
(8) Drill Rig:	Mar MZ.5T
(9) Drilling Contractor:	Gregg Drilling / Martinez CA
(10) Driller/Helper:	Eric Sandellan / Rich Ryan
(11) Drilling Method:	Direct Push
(12) Sample Method:	GEOPROBE
(13) Hammer Weight/Drop:	N/A
(14) Bentonite Gel Used:	N/A
(15) Borehole Diameter, Pilot:	N/A
Final:	N/A
(16) Borehole Started, Time/Date:	1246 / 9/28/10
(17) Borehole Completed, Time/Date:	1302 / 9/28/10
(18) Water Source:	N/A
Notes:	DRILLED BY GEOPROBE SOIL BORING ONLY - NO WELL
(19) Well Started, Time/Date:	N/A
(20) Well Completed, Time/Date:	N/A
(22) Water Depth	NO WATER
Boring/Casing Depth	
Time	
Date	
(21) Well Head Completion	N/A

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth:	17'
(24) Casing Depth:	N/A
(25) Screened Interval:	N/A
(26) Sand Pack, #3	N/A
#0/30:	N/A
(27) Well Development Method:	N/A
Time:	
Date:	
Flow Rate:	
(28) Geophysical Logs, Type:	N/A
By:	
Date	
(29) Circulation:	N/A

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												Hand Auger 0 to 5' bgs.
		HA				B-419-012-0F						AC/AB	1" AC on 11" AB
										1			
						B-419-012-1F						MC	(1-9) Sandy Silt (ML) dark yellowish
										2			brown (10YR 3/4), m. stiff, moist,
													f. sand, SR-SA, 85% Silt, 15% Sand LEK
										3			
						B-419-012-3F							
										4			
										5			
		DP 5		42/48							X		
										6	X		
						B-419-012-6F					X		
										7	X		
											X		
										8	X		
											X		
										9	NR		(9-17) Sandy Gravel (GP) light yellowish
		DP 9		42/48							X	GP	brown (2.5Y 6/4), m. dense, moist, f to c
										10	X		Sand & gravel, SR-SA, 60% gravel, 40% sand HEK

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; yiw = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA closure

(3) Borehole/Well No.: B-419-012

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 cont		42/48 cont.							X	GP	SANDY GRAVEL (GP) as ABOVE
											X		
						B-419-012-11F				1	X		
											X		
										2	X		
											X		
										3	NR		
		DP 13		48/48							X		
										4	X		
											X		
										5	X		
											X		
										6	X		
						B-419-012-16F					X		
										7	X		TD=17' 1302 9/28/10 AN
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

[Subsections listed in Section 6.4 of SOP 1.1 (i.e. (2) = 6.4.2, etc.)]

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N

B-419-013

B419

8511

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-013

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConite

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling Martinez, CA

(10) Driller/Helper: Armando Torres / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand auger & Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 0.6'-3' **Final:** 2 1/4-inch: 3'-16'

(16) Borehole Started, Time/Date: 13:05 8/2/2011

(17) Borehole Completed, Time/Date: 13:40 8/2/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

Notes: Soil core had readings of 0 mg/cm³ with Hg sniffer and had α, β, and gamma at bkgd levels

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft **(24) Casing Depth:** N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A **#0/30:** N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A **(29) Circulation:** N/A

By: — Date —

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Coring		0.6/0.6				Type II-V Portland Cement Grout				Concrete	(0.0-0.6) Concrete slab. ~0.6'
		HA to 3.0'		2.4/2.4		1F (13:10)				1		Baserock	(0.6-1.0) Gravel baserock. ~1.0'
						2F (13:15)				2		Sandy Silt	(1.0-3.5) Sandy Silt, (ML) yellow brown, (10YR 4/3), med, damp, 10-20% vf-m sand, tight, LEK. ~3.5'
		DP to 4.0'		1.0/1.0						3			(3.5-4.0) Gravelly Silt (ML) yellow brown, (10YR 4/3), med, damp, 15% SA gravel to 1.25 inch, 10% vf-vc sand, LEK-M ~4.0
		DP to 8.0'		3.4/4.0		5F (13:32)				4		Grav. Silt	
										5		Gravelly Silt	(4.0-16.0) Gravelly Sand (SM/SW) yellow-brown (10YR 5/4), dense, damp, SA-SR gravels to 1 in, 15-25% vf-vc sand, 10% fines, MEK.
										6			
										7			
										8	NR		
		DP to 12.0'		3.1/4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @´= at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-013

Notes:

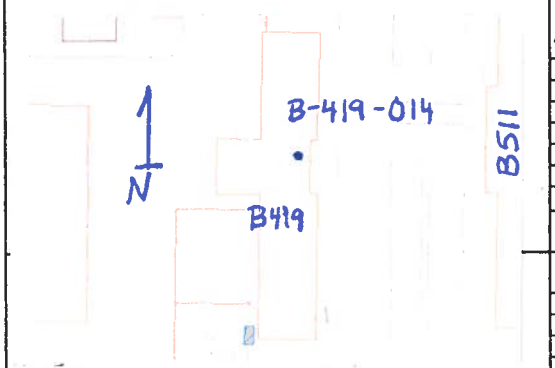
(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact
						-10F (13:43)		Type II-V Portland Cement Grout		10		Gravelly Sand
										11	NR	
		DP to 16'		4.0 / 4.0						12		
										13		
										14		
										15		
						-15F (13:55)				16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

Gravelly Sand (SM/SW), cont'd

T.D. = 16.0 ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-014

(4) Job No.: 33824-B419.3.3

(5) Logged By: W. M. McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling Martinez, CA

(10) Driller/Helper: Armando Torres / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand auger & Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 0.5'-3 Final: 2 1/4-inch: 3-4.5'

(16) Borehole Started, Time/Date: 8:06 / 8/3/2011

(17) Borehole Completed, Time/Date: 8:50 8/3/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 4.5 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at background levels
		Concrete Coring		0.5/0.5								Concrete	(0.0-0.5) Concrete slab
		HA to 3.0'		2.4/2.4		-1F (8:10)		Type II-V Portland Cement Grout		1		Gravel	(0.5-1.0) Gravel baserock
						-2F (8:20)				2		Clayey Silt	(1.0-3.1) Clayey Silt (ML), brown (10 YR 4/3), med, damp, trace sand, low plasticity, 1 F.K; trace SA-SR gravel gravel to 2 inches
										3			
		DP to 3.0		1.0/1.0						4		Concrete + debris	(3.1-4.5) Concrete chips and debris.
		DP to 4.5'											
										5			
										6			
										7			T.D. @ 4.5 ft bgs refusal due to concrete.
										8			
										9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

B-419-014A

B511

B419

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-014A

(4) Job No.: 33824-B419.3.3

(5) Logged By: William McGoniba

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5 DP

(9) Drilling Contractor: Gregg Drilling, Martinez, CA

(10) Driller/Helper: Vince Pokrywka / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand auger + Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 0.5-3' Final: 2 1/4-inch: 3-16'

(16) Borehole Started, Time/Date: 11:13 8/10/2011

(17) Borehole Completed, Time/Date: 11:55 8/10/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

Notes: Soil core had readings of 0 mg/cm3 with Hg sniffer and had α, β, and gamma at bkgd level

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	South of B-419-014
		Concrete Coring		0.5/0.5				Grout					(0.0-0.5) Concrete slab ~0.5'
		HA to 3.0'		2.5/2.5		-1F (11:17)		Portland Cement		1		Silty Sand	(0.5-0.75) Gravel basecrock ~0.75'
						-2F (11:25) -DUP-2F (11:30)		Type II-V		2			(0.75-4) Silty Sand (SM), dark yellow brown (10YR 3/2), med, moist, vf-vc grained, 10-20% SR gravels to 2 inches Silty fines, L-MEK.
		DP to 4.0'		0.3/1.0						3	NR		~4.0'
		DP to 8.0'		2.6/4.0		-5F (11:45)				4		Gravelly Sand	(4.0-8.0) Gravelly Sand (SW/SM) light olive brown (2.5Y 5/3), med, damp vf-vc grained, 30-40% SA-SR gravels to 1.5 inches, 5% fines,
										5			
										6			
										7	NR		~8.0'
										8			
		DP to 12.0'		3.2/4.0						9		Sand	(8.0-12.0) Sand (SW) pale yellow (2.5Y 7/4) loose, dry, vf-c grained, 5% SA-SR gravels to 3/4-inch, trace fines L-MEK.
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

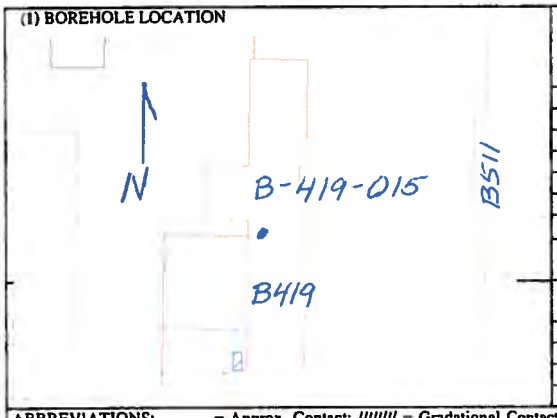
(3) Borehole/Well No.: B-419-014A

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	Well Casing	Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (11:58)		Type II-V Portland Cement Grout		10			Sand (SW), cont'd
										11		Sand	
											NR		
										12			~12.0
		DP to 16.0'		3.4 / 4.0						13		Sand	(12 16) Sand (SM/SW), pale y (2.5Y 7/4), loose-med, dry, vf-c grained, 10% SA-SR gravels to 1/2-inch, 5% fines, MEK.
										14			
										15			
						-15F (12:05)				16	NR		
										17			T.D.=16.0ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: Sample cooler was measured at ALS at 12°C upon arrival. The soil samples from borehole B-419-015 were compromised and not analyzed.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-015

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConiba

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5 DP

(9) Drilling Contractor: Gregg Drilling, Martinez, CA

(10) Driller/Helper: Armando Torres / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Direct-push: 0.7-16'

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 2 1/4-inch Final: 2 1/4-inch

(16) Borehole Started, Time/Date: 10:02 8/2/2011

(17) Borehole Completed, Time/Date: 10:40 8/2/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; bm = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil Core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		Concrete Coring		0.7/0.7				Type II-V Portland Cement Grout				Concrete	(0.0-0.7) Concrete slab ~0.7'
		DP to 4.0'		1.8/3.3		1F (10:10)				1		Basem.	(0.7-0.95) Gravel baserock ~0.95'
										2		Sandy Gravel	(0.95-4.0) Sandy Gravel (GP), gray (10YR 6/2), med, damp, SR gravels to 3/4-inch, 10-15% vf-vc sand, MEK, Shoe blocked off @ 2.5 feet
										3	NR		
										4			~4.0'
		DP to 8.0'		3.3/4.0						5		Silty Sand	(4-8) Silty Sand (SM) brown (7.5YR 4/3), med, damp, vf-vc grained, 10-15 fines, trace SA gravels to 0.3-inch, L-MEK.
						5F (10:22)				6			
										7			
										8	NR		~8'
		DP to 12.0'		4.0/4.0						9		Sandy Silt	(8-10) Sandy Silt (ML) yel brn (10YR 5/4), med, damp, 10-20% vf-m sand, 11% SA gravels to 0.25 inch, tight
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation.

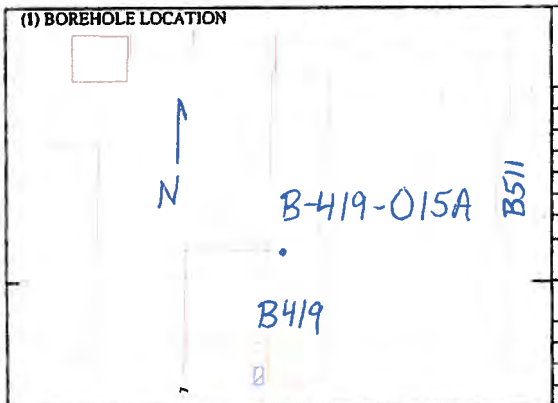
(3) Borehole/Well No.: B-419-015

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (11:13)				10		Sand	(10.0-11.8) Sand (SP), yellow brn (10YR 5/4), loose, damp, vf-m grained, trace fines, MEK.
								Type IV-V Portland Cement Grout		11			11.8'
		DP to 16.0'		4.0/4.6						12		Sandy Gravel	11.8 - 16 Sandy Gravel (GP) gray brown (2.5Y 6/2), med, dry, SR gravels to 1.25-inch, 10-20% vf-m sand
										13			
										14			@ 15.4-15.7 ft, Sandy Silt interbed
						-15F (11:25)				15			
										16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: Borehole drilled and soil sample collected to substitute for samples that were compromised from borehole B-419-015.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-015A

(4) Job No.: 33824-B419.3.3

(5) Logged By: William McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling Martinez, CA

(10) Driller/Helper: Vince Pokrywka / Richard Ryon

(11) Drilling Method: Direct-push

(12) Sample Method: Hand auger & Direct-push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 0.5-3' Final: 2 1/4-inch: 3'-16'

(16) Borehole Started, Time/Date: 9:04 8/15/2011

(17) Borehole Completed, Time/Date: 9:37 8/15/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	—
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A

(29) Circulation: N/A

By: — Date —

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
		Concrete Coring		0.5/0.5				Type II-V Portland Cement Grout				Concrete
		HA to 3.0'		2.5/2.5		1F (9:08)				1		Sandy Gravel
						2F (9:15)				2		
		DP to 4'		1.0/1.0						3		Sandy Silt
		DP to 8.0		2.8/4.0						4		
						5F (9:30)				5		
										6		Gravelly Sand
										7	NR	
										8		
		DP to 12.0'		3.0/4.0						9		
										10		

(42) LITHOLOGIC DESCRIPTIONS

Soilcore had readings of 0 mg/cm³ with Hg sniffer and had α, β, and gamma at bkgd levels

(0.0-0.5) Concrete slab -0.5

(0.5-2.1) Sandy Gravel, (GP) gray (10YR 6/2), med, damp SR gravels to 3/4-inch, 10-15% vf v. sg d, MEK. 2.1'

(2.1-5.3) Sandy Silt (ML), brown (10YR 4/3), firm, dry, 10-15% vf m sand, trace gravels to 3/8-inch, LEK -5.3'

(5.3-16.0) Gravelly Sand, (SW) Yellow brown (10YR 5/4), loose dry, vf-vc grained, 15-20% SA gravels to 1 1/2 inch, MEK.

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

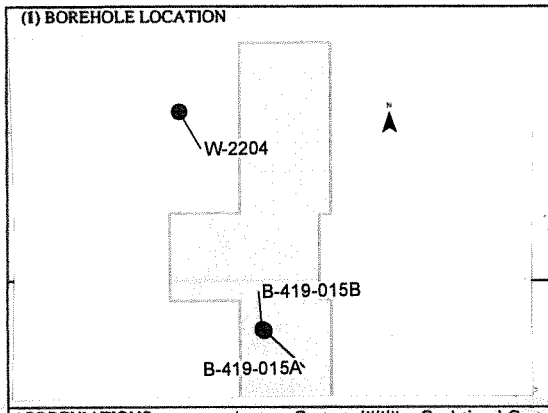
(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation.

(3) Borehole/Well No.: B-419-015A

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (9:44)		Type II-V Portland Cement Grout		10			Gravelly Sand (SW), cont'd.
										11	NR	Gravelly Sand	
		DP to 16.0'		4.0/4.0						12			
										13			
										14			
						-15F (9:55)				15			
										16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: The numbers listed

Borehole/Well Construction Log



(1) BOREHOLE LOCATION	
(2) Project: LLNL, B419 Closure Phase IIA Soil Investigation	(3) Borehole/Well No.: B-419-015B
	(4) Job No.: 33824 B419.33
(5) Logged By: William McCribe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M2.5 DP
(9) Drilling Contractor: Gregg Drilling, Martinez, California	
(10) Driller/Helper: Armando Torres / No helper	
(11) Drilling Method: Direct-Push	(12) Sample Method: Direct-Push, 0.5'-16'
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 5/8 inch	Final: 2 5/8-inch
(16) Borehole Started, Time/Date: 9:50 8/30/2012	(17) Borehole Completed, Time/Date: 10:45 8/30/12 — (18) Water Source: Rig tank
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP = Direct-Push. α+β Bkgd = 20 cps

(23) Total Depth: 16 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —	(29) Circulation: No loss of cuttings

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Feet Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		Concrete			RINSEATE-CB-B-419-015B		TTLC MET	Concrete Core				Concrete	(0.0-0.5) Concrete slab ⌐0.5'
	Hg= 0 mg/m3 No α +β over bkgd	DP 0.5'-4.0'		2.5/3.5				Bentonite Chips		1		Sandy Gravel	(0.5-0.6) Sand (SP), light gray (2.5Y 6/1), med, dry, vf-m grained, MEK. ⌐0.6'
										2		Sand	(0.6-1.15) Sandy Gravel (GP), light gray brown (2.5Y 6/2), med., dry, SR-R gravels to 0.25 inch, 20-25% vf-m sand, MEK-H. ⌐1.15'
										3		Clayey Silt	
										4	NR		(1.15-1.7) Sand (SP), light gray brown, (2.5Y 6/2), med to loose, damp, vf-m grained, trace silt, MEK, LE2K. ⌐1.7'
	Hg= 0 mg/m3 No α+β over bkgd	DP 4.0'-8.0'		3.0/4.0						5		Sandy Gravel	(1.7-3.0) Clayey Silt (ML), brown (10YR 4/3), hard, dry, LP, 10% SA gravels to 3/8-inch, LEK, LE2K. ⌐3.0'
										6		Sandy Gravel	
										7			(3.0-4.0) No Recovery ⌐4.0'
								Soil Cuttings (Derived from 0.5-10 ft)		8	NR		(4.0-5.6) Sandy Gravel (GP), light gray (10YR 7/2), med, dry, SR-R gravels to 3/8-inch, 20-25% vf-vc sand, MEK, LE2K. ⌐5.6'
	Hg= 0 mg/m3 No α+ β over Bkgd.	DP 8.0'-12.0'		4.0/4.0						9		Sandy Gravel	(5.6-7.0) Sandy Gravel (GP) yellow-brown, (10YR 6/4), med., dry, SA-SR gravels to 1-inch, 20-30% vf-vc sand, 5-10%
										10			

Note: Numbers **1–42** listed on this log correspond to Subsections **6.4.1–6.4.42** of SOP 1.1.

------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven (Feet)	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact
						-10F	TCLP MET TCLP EX 3060A	Bentonite Chips		10		Sand
							-7196			11		
										12		Sandy Gravel
	Hg= 0 mg/m³	DP 12.0'		4.0/4.0		-12F	TCLP MET TCLP EX			13		
	Not +B over bkgd	16.0'					3060A -7196			14		
							TCLP MEK			15		
						-15F	TCLP EX 3060A -7196			16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

(2) Project: LLNL, B419 Closure Phase IIA Soil Investigation

(3) Borehole/Well No.: B-419-015B

Notes:

fines, MEK -7.0'

(7.0-8.0) No Recovery -8.0'

(8.0-10.2) Sandy Gravel (GP), as above at 5.6 feet.

@10 ft, SA gravel to 2.0 inches, fractured. -10.2'

(10.2-10.8) Sand (SP), yellow brown (10YR 5/4), med, damp, vf-m grained, trace c sand, 10% SA gravels to 0.25-inch, MEK, LE2K. -10.8'

(10.8-16.0) Sandy Gravel, (GP), yellow brown, (10YR 5/4), hard, damp, SA gravels to 1.25-inch, 20-30% vf-c sand, 5% fines, MEK, LE2K

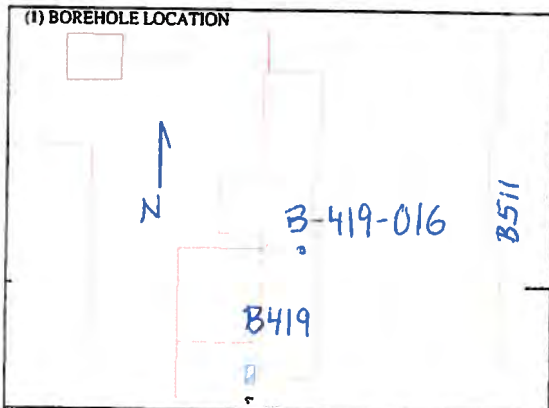
T.D. = 16.0ft 8/30/2012 @ 1045

Note: The numbers listed in parentheses on this log correspond to the Subsections listed in Section 6.4 of SOP 1.1 [i.e., (2) = 6.4.2, etc.].

Note: Sample cooler was measured at AL at 12°C upon arrival. The soil samples were compromised and not analyzed.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-016
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConiba	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M2.5 DP
(9) Drilling Contractor: Gregg Drilling, Martinez, CA	
(10) Driller/Helper: Armando Torres / Richard Ryan	
(11) Drilling Method: Direct-push	(12) Sample Method: Direct-push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 8:15 / 8/2/2011	(17) Borehole Completed, Time/Date: 8:40 8/2/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A
(21) Well Head Completion: N/A	

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth				
Time				
Date				

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time:	Date:	Flow Rate:
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By:	Date	

(30) OVA/PID Field Readings (ppm) | (31) Sampler Type/Depth | (32) Blows 6 inches | (33) Inches Recovered/Inches Driven | (34) (Sample Condition/RQD | (35) Sample ID | (36) Analysis | (37) Well Annulus/Borehole Filler | (38) Well Casing | (39) Depth in Feet | (40) Recovery/Sample Loc. | (41) Contact

Soil/Rock | Work Area

Sampler Type/Depth	Inches Recovered/Inches Driven	Sample ID	Well Annulus/Borehole Filler	Depth in Feet	Contact	(42) LITHOLOGIC DESCRIPTIONS
						Soil core had reading of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels.
Concrete Coring	0.6/0.6		Portland Cement Grout		Concrete	(0 - 0.6) Concrete slab — 0.6'
DP to 4.0'	1.6/3.4	1F (8:25)		1	Baserock	(0.6 - 0.93) Crse base, SA-SR gravels to 3/8" — 0.93'
				2	Sand	(0.93 - 4.0) Sand (SP), gray brown (7.5YR 4/3), loose, damp, vf-m grained, L-MEK.
		Not enough soil recovered for sample at 2ft		3		
				4		— 4.0'
DP to 8.0'	2.0/4.0	5F (8:40)		5	Sandy Silt	(4 - 8) Sandy Silt (ML), brown (7.5YR 4/3), stiff, damp, 10-25% vf-f sand, tight, LEK.
			Type II-V	6		
				7		
				8		— 8.0'
DP to 12.0'	3.5/4.0			8	Gravelly Sand	(8 - 8.75) Grav y Sand (SM/SW) gray-brn (10YR 8/2) loose, dry, vf-vc grained
				9	Sandy Silt	10-20% SH gravels to 1/2-inch, 10% fines, fines downward, MEK.
				10		

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-016

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
						-10F (9:00)		Portland Cement Grout →		10		Silty Sand
										11		
										12	NR	Silty Sand / Gr Sand
		DP to 16.0'		2.0/4.0						13		Silty Sand
						-13.5F1 (9:20)		← Type II-V		14		
										15	NR	Gravelly Sand
										16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

Notes:

(8.75 - 10.0) Sandy Silt (ML), yel-brn (10YR 5/4) med, damp, 10-15% vf-f sand, tight, LEK. 10'

(10 - 11.25) Silty Sand (SW/SM), yel-brn (10YR 6/4) loose, dry, vf-c grained, trace gravels to 0.25-inch, 5% fines, M-LEK. 11.25'

(11.25 - 12) Silty Sand (SM), yel brn (10YR 5/4) med, damp, vf-m grained, 15% fines, LEK-M. 12'

(12 - 12.6) Gravelly Sand (SM/SW), as above at 8-8.75 ft, SR gravels to 3/4-inch 12.6'

(12.6 - 13.9) Silty Sand (SM) as at 11.25-12 ft. 13.9'

(13.9 - 16) Gravelly Sand (SM/SW) as at 12-12.6 ft very tight, SR gravels to 1 1/4-inch

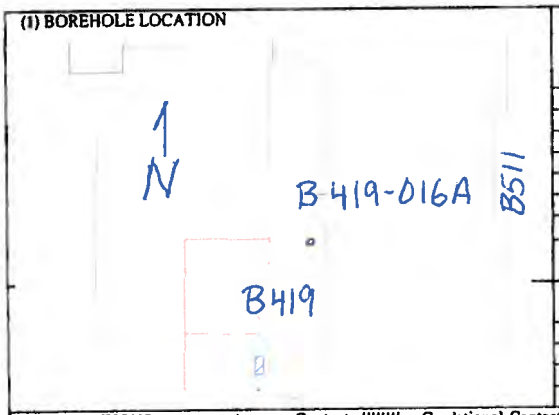
T.D. = 16.0 ft

Note: The numbers listed in parentheses on this log correspond to the Subsections listed in Section 6.4 of SOP 1.1 (i.e., (42) = 6.4.2, etc.).

Note: Borehole drilled and soil sum[illegible] to substitute for sample that were compromised from borehole B-419-016.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-016A
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Buschbeck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M2.5DP
(9) Drilling Contractor: Gregg Drilling, Martinez, CA	
(10) Driller/Helper: Armando Torres / Richard Ryan	
(11) Drilling Method: Direct-push	(12) Sample Method: Hand auger & Direct-push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 3 3/4-inch: 0.5'-3'	Final: 2 1/4-inch: 3'-16'
(16) Borehole Started, Time/Date: 13:30 8/10/11	(17) Borehole Completed, Time/Date: 14:05 8/10/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —	(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
		Concrete Coring		0.5/0.5				Type II-V Portland Cement Grout				Concrete
		HA to 3.0'		2.5/2.5		-1F (13:35)				1		Sandy Gravel
						-2F (13:45)				2		
		DP to 4.0'		1.0/1.0						3		Silty Clay
		DP to 8.0'		3.1/4.0						4		
						-5F (14:00)				5		
										6		
										7		
											NR	
										8		
		DP to 12.0'		3.3/4.0						9		
										10		Silty Sand

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0mg/cm3 with Hg sniffer and α, β, and gamma at bkgd levels

(0.0-0.5) Concrete slab — 0.5'

(0.5-2.1) Sandy Gravel (GM), gray, brown, pea gravel — 2.1'

(2.1-9.3) Silty Clay (CL), olive-brown (2.5Y 4/3), med, damp, trace vf-vc sand, low plasticity, LEK @3.5ft, soil tight, trace SA gravels to 0.5-inch — 9.3'

(9.3-9.9) Silty Sand (SM, olive yellow (2.5Y 6/6), med, damp, vf-f grained, 15-20% fines, L-MEK.

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

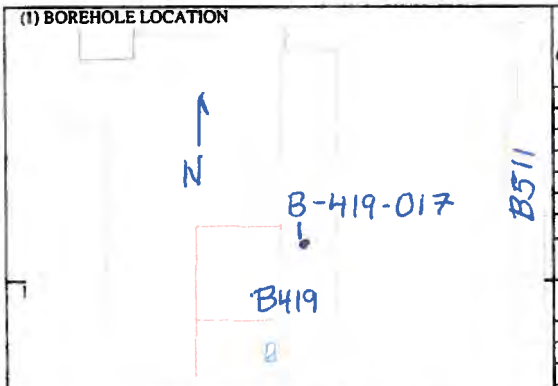
(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-016A

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
						-10F (14:10)		Grout		10			(9.9 - 16.0) Gravelly Sand (SW) light yellow brown (10YR 6/4), moist, damp, vf - c s ind, 20-30% SA-SR gravels to 1.25-inch, trace fines
										11		Gravelly Sand	
											NR		
		DP to 16.0'		3.4/4.0				Type II-V Portland Cement		12			
										13			
										14		Silty Clay	@ 13.1 - 14.4 feet, yellow brown silty clay interbed.
										15		Gravelly Sand	
						-15F (14:22)				16	NR		
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-017
	(4) Job No.: 33924-B419.3.3
(5) Logged By: Will McLenine	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M2.5DP
(9) Drilling Contractor: Gregg Drilling Martinez, CA	
(10) Driller/Helper: Armando Torres / Richard Ryan	
(11) Drilling Method: Direct-push	(12) Sample Method: Direct-push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 9:39 / 8/1/11	(17) Borehole Completed, Time/Date: 10:15 / 8/1/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A
(21) Well Head Completion N/A	

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date —	

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd. levels

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Coring		0.7/0.7		-0.8F (9:45)		Type II-V Portland Cement grout				Concrete	(0-0.7) Concrete slab — 0.7
		DP to 4.0'		1.0/3.3						1		Gravel	(0.7-1.0) Sand Gravel (GM), gray brown (10YR 6/2) loose, damp, SR gravels to 0.25-inch, 20-30% vf-vc sand, 10% fines, MEK. — 1.
					Not enough soil recovery for r-2F sample					2		Clayey Silt	
										3	NR		(1.0-8.0) Clayey Silt (ML) yellow brn (10YR 4/4), stiff, damp, 5% vf-vc sand LEK.
										4			
		DP to 8.0'		1.8/4.0		-4.5F (10:00)				5			
										6			
										7			
										8			— 8.1
		DP to 12.0'		2.2/4.0						9		Silty Sand	8-16 Silty Sand (SM), light yellow brown (10YR 6/4), loose, damp, vf-m grained trace fines MEK.
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

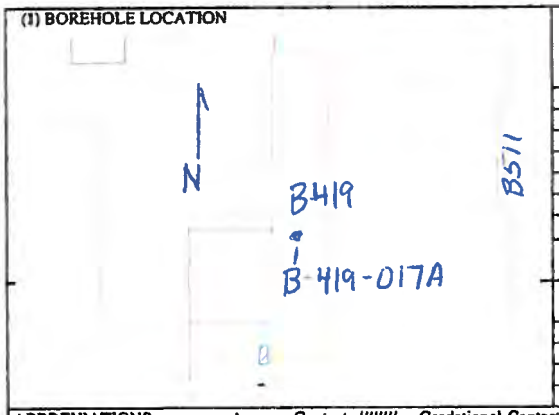
(3) Borehole/Well No.: B-419-017

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
										10			Silty Sand (SM), cont'd
						10F (10:15)		Type II-V Portland Cement Grout			NR		
										11			
										12	NR		
		DP to 16.0'								13			
										14			Recover 14-16 ft, driller indicated.
				2.0/4.0						15			
						15F (10:25)				16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: The numbers listed in parentheses on this log correspond to the Subsections listed in Section 6.4 of SOP 1.1 [i.e., (2) = 6.4.2, etc.].

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-017A
	(4) Job No.: 33824-B41933
(5) Logged By: Will McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: N/A
(9) Drilling Contractor: Gregg Drilling	
(10) Driller/Helper: Armando Torres / Richard Ryan	
(11) Drilling Method: Hand-auger	(12) Sample Method: Hand-auger
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 3 3/4-inch	Final: 3 3/4-inch
(16) Borehole Started, Time/Date: 9:05 9/19/2011	(17) Borehole Completed, Time/Date: 9:15 / 9/19/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 3 ft | (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3 N/A #0/30: N/A
(27) Well Development Method: N/A
Time: — Date: — Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —
(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm² with Hg sniffer and α, β, and gamma at bkgd levels.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Trench cut		0.6/0.6				Type N-V Portland Cement Grout				Concrete	(0.0)-0.6) Concrete slab ~0.6'
		HA to 3.0'		2.4/2.4						1		Gravel	(0.6-0.8) Gravel Baserock ~0.8'
												Sandy Clay	(0.8-3.0) Sandy Clay (CL), yellow brn (10YR 5/4) stiff, damp, 15-20% vf-m sand, LEK.
					-	2F (9:10)				2			
										3			
										4			T.D. = 3.0 ft
										5			
										6			
										7			
										8			
										9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: SEE ATTACHED MAP	(2) Project: LLNL S200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-018
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: A. Niemand	(6) Edited By: M. BUSCHELLI
	(7) Project Manager: N. Morrow	(8) Drill Rig: Mari M2.5T
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Eric Bantellas / Rich Ryon	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: None
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 1028 / 9/30/10	(17) Borehole Completed, Time/Date: 1110/9/30/10
		(18) Water Source: N/A
Notes: DRIVED BY GEOPROBE Soil Boring Only - No Well	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth / Boring/Casing Depth / Time / Date: NO WATER	(21) Well Head Completion: N/A

ABBREVIATIONS: ——— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 17	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: Date:	Flow Rate:
(28) Geophysical Logs, Type: N/A By: Date	(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		HA				B-419-018-OF	B-419-018-DUP-OF					AC/AB	1" AC on 11" AB
						B-419-018-1F	B-419-018-DUP-1F			1		SM	(1-5) Silty Sand (SM) brown (7.5YR 4/3) m. dense, moist, f sand, SR-SA, 75% sand 25% silt, MEK
										2			
										3			
						B-419-018-3F	B-419-018-DUP-3F			4			
										5			(5-15) Sandy Gravel (GP) light yellowish brown (2.5Y 6/4) m. dense, moist, f to c sand and gravel, SR-SA, 60% gravel 40% sand, MEK
		DP 5		48/48						6		GP	
						B-419-018-6F				7			
										8			
										9			
		DP 9		42/48						10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K= Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

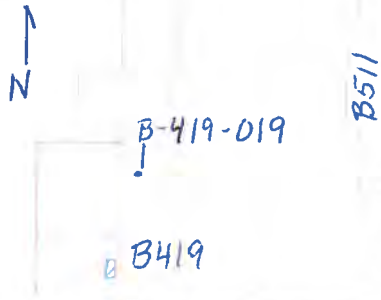
(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-018

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		DP 9 Cont.		4/48							X	GP	Sandy Gravel (GP) As above
						B-419-018-11F				1	X		
										2	X		
										3	NR		
		DP 13		48/48						4	X		
										5	X		
										6	X	ML	(15-17) Sandy Silt (ML) light brownish gray (2.5Y 6/2), m. stiff, moist, f. sand, SR-SA 85% Silt, 15% Sand, LEK
						B-419-018-16F				7	X		
													TD = 17 1110 9/30/10 AW
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-019

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling Martinez, CA

(10) Driller/Helper:

(11) Drilling Method: Direct-push

(12) Sample Method: Direct-push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 2 1/4-inch Final: 2 1/4-inch

(16) Borehole Started, Time/Date: 11:28 7/27/11

(17) Borehole Completed, Time/Date: 11:45 7/27/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP= Direct-Push

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Coring		0.7/0.7				Type II-V Portland Cement Grout				Concrete	(0, 0.7) Concrete slab ~0.7'
		DP to 4.0'		2.1/3.3		0.8F (11:48)				1		Sandy Gravel	(0.7 1.45) Sandy Gravel (GM), gray-brn (2.5Y 5/1), loose-med, damp, SR gravels to 1/4-inch, 20-30% vf-vc sand, 10% fines, MEK. ~1.45
										2		Clayey Silt	
										3	NR		(1.45 – 6.3) Clayey Silt (ML) yel-brn (10YR 4/3) stiff, damp, 10% sand, tight, LEK
										4			
		DP to 8.0'		3.4/4.0		4F (11:55)				5			~6.3
										6		Silty Sand	(6.3 – 11) Silty Sand, (SM) yel-brown (10YR 7/4), loose, damp, vf-c grained, 15% fines, 10% SR gravels to to 3/4-inch, MEK.
						6.8F (12:10)				7			
										8	NR		
		DP to 12.0'		3.5/4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

—— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

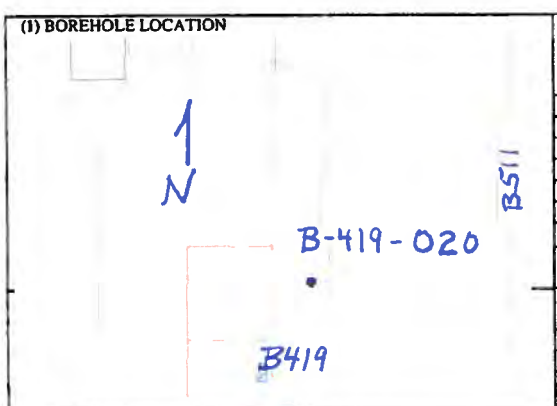
(3) Borehole/Well No.: B-419-019

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filter	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
						-10F 1224		Type II-V Portland Cement Grout		10		Silty Sand	Silty Sand (SM), cont'd
										11			-11.0
												Gravelly Sand	(11-12.1) Gravelly Sand (SM/SW), brown-gray (10YR 6/2), med, damp, vf-c grained, 20-30 % SA-SR gravels to 1/4-inch, 15% fines, MEK
		DP to 12.0'		2.8/4.0						12	NR		-12.1'
										13		Silty Sand	-(12.1-16) Silty Sand (SM), brown-gray (10YR 6/2), med, damp, vf-m grained, 15% fines, LEK-M.
						-14F (12:35)				14			
										15	NR		
										16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: The numbers listed in parentheses on this log correspond to the Subsections listed in Section 6.4 of SOP 1.1 [i.e., (2) = 6.4.2, etc.].

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-020
	(4) Job No.: 33824-B419.33
(5) Logged By: William McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M25DP
(9) Drilling Contractor: Gregg Drilling, Martinez, CA	
(10) Driller/Helper: Armando Torres / Richard Ryan	
(11) Drilling Method: Direct-push	(12) Sample Method: Direct-push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 8:24 / 8/1/11	(17) Borehole Completed, Time/Date: 8:45 8/1/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP= Direct-push

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —	(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Coring		0.6/0.6				Type II-V Portland Cement Grout				Concrete	(0.0-0.6) Concrete slab ~0.6'
		DP to 4.0'		2.0/3.4		-0.8F (8:30)				1		Sand	(0.6-1.1) Sand (SW), gray-brown (10YR 6/2), med, damp, vf-vc grained 10% SR gravels to 0.25-inch, trace fines, MEK. 1.
										2		Sandy Silt	(1.1-6.3) Sandy Silt (ML) brown, (7.5YR 4/3), med, damp, 10-15% vf-vc sand, trace SA gravels to 0.25-inch, LEK-M.
										3	NR		
										4			
		DP to 8.0'		2.9/4.0		-4F (8:45)				5			
										6			6.3'
						-6F (8:55)				7	NR	Gravelly Sand	(6.3-16) Gravelly Sand (SW), brown (7.5YR 4/3), med to loose, damp, vf-c grained, 30-40% SA gravels to 0.5-inch, trace fines, MEK.
										8			
		DP to 12.0'		4.0/4.0						9			@9.4-9.7ft, silty sand interbed
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; bra = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-020

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (9:05)		Portland Cement Grout		10			Gravelly Sand (SW), cont'd. occasional SA gravels to 1.25-inch below 10 ft @ 11 feet, yellow brown (10YR 6/4)
										11			
										12		Gravelly Sand	
		DP to 16.0'		4.0/4.0						13			
										14			
						-15F (9:15)		Type II-V		15			
										16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: The numbers listed in parentheses on this log correspond to the Subsections listed in Section 6.4 of SOP 1.1 [i.e., (2) = 6.4.2, etc.].

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N

B419

B511

B-419-021

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-021

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5 DP

(9) Drilling Contractor: Gregg Drilling Martinez, CA

(10) Driller/Helper: Vince Tokrywka / Armando Torres

(11) Drilling Method: Direct-push

(12) Sample Method: Direct-push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 2 1/4-inch Final: 2 1/4-push

(16) Borehole Started, Time/Date: 8:55 7/27/11

(17) Borehole Completed, Time/Date: 9:20 7/27/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented, DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP = Direct-Push

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		Concrete Coring		0.7/0.7		-0F, B-419-COMP-004		Type II-V Portland Cement Grout				Concrete	(0.0-0.7) Concrete slab ~0.7'
		DP to 4.0'		2.1/3.3		-1.3F (9:05)				1		Sand	(0.7-4.7) Sand (SW), dark gray, (5Y 4/1), med, moist, vf-vc grained, trace fines, MEK-H.
										2			
										3	NR		
										4			~4.7
		DP to 8.0'		3.2/4.0		-4F (9:15)				5		Clayey Silt	(4.7-5.8) Clayey Silt (ML), yellow brn (10YR 5/6), stiff, damp, LEK. ~5.8
										6			
						-7F (9:25)				7	NR	Sandy Gravel	(5.8-16) Sandy Gravel, (GM), yel-brn, (10YR 3/4), med, damp SA gravels to 3/4 inch, 10-20% vf vc sand, 15%+ fines, LEK-M.
		DP to 12.0'		1.6/4.0						8			@ 8 ft, same as at 5.8 ft
						-9F (9:45)				9			
										10	NR		

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

_____ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

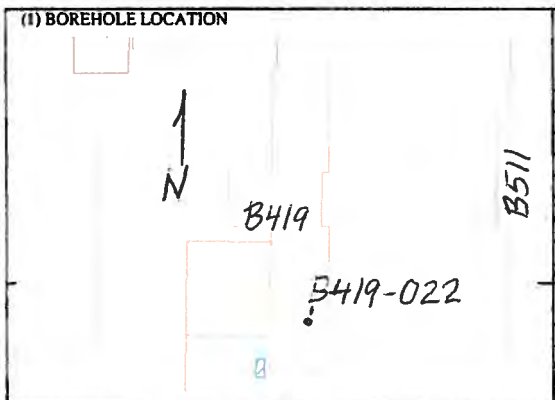
(3) Borehole/Well No.: B-419-021

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
										10	NR		Sandy Gravel (GM), cont'd
								Type IV-V Portland Cement Grout		11			
										12		Sandy Gravel	
		DP to 16.0'		3.1/4.0						13			
										14			
										15			
						15F (9:50)				16	NR		
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: The numbers listed in parentheses on this log correspond to the Subsections listed in Section 6.4 of SOP 1.1 [i.e., (2) = 6.4.2, etc.].

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-022
	(4) Job No.: 33824 B419.3.3
(5) Logged By: William McCapine	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M 2.5 DP
(9) Drilling Contractor: Gregg Drilling Martinez, CA	
(10) Driller/Helper: Vince Pokrywka / Armando Torres	
(11) Drilling Method: Direct Push	(12) Sample Method: Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 10:50 / 7/26/11	(17) Borehole Completed, Time/Date: 11:40 / 7/26/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP = Direct-Push

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date —	

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		Concrete Coring		0.5 / 0.5				Type II-V Portland Cement Grout				concrete	(0.0-0.5) Concrete slab -0.5'
		DP to 4.0'		2.7 / 3.5		-0.5F (11:05)				1		Sandy Gravel	(0.5-1.35) Sandy Gravel, (GM) gray brown (10YR 5/2), med, moist, SA gravels to 1/2-inch, 15-20% vf-vc sand 5-10% fines, MEK-L. -1.35
						-2F (11:15)				2		Sandy Silt	
										3			(1.35-8.2) Sandy Silt (ML), yel-brown (10YR 4/3), med, damp; 10-15% vf-f sand, tight, slightly plastic, LEK.
										4	NR		
		DP to 8.0'		4.0 / 4.0						5			
						-5F (11:22)				6			
										7			
										8			-8.2
		DP to 12.0'		4.0 / 4.0						9		Sand	(8.2-11) Sand, (SW), brown (10YR 4/1) dense, damp, f-vc grained, MEK.
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation

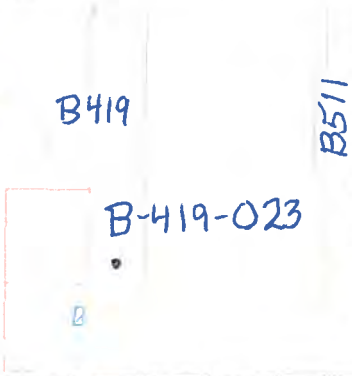
(3) Borehole/Well No.: B-419-022

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 Inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
						10F (11:40)		Type II-V Portland Cement Grout		10		Sand	Sand (SW), cont'd
										11			(11-16) Silty Sand (SM), brown (10YR 4/3), dense, damp, vf-c grained, 10-15% fines, 5% SA gravels to 1/4-inch, tight, MEK; fine grained silty sand at 13.45-14.3 ft;
		DP to 16.0'		4.0/4.0						12		Silty Sand	
										13			
										14			@ 14.3 ft, coarse grained silty sand
						15F 11:55				15			
										16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: The numbers listed in parentheses on this log correspond to the Subsections listed in Section 6.4 of SOP 1.1 [i.e., (2) = 6.4.2, etc.].

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project:	LLNL, B419 RCRA Closure Phase II Soil Investigation
(3) Borehole/Well No.:	B-419-023
(4) Job No.:	33824-B419.3.3
(5) Logged By:	Will McConihe
(6) Edited By:	Mark Burcheck
(7) Project Manager:	Valerie Morrow
(8) Drill Rig:	MARL M2.5 DP
(9) Drilling Contractor:	Gregg Drilling Martinez, CA
(10) Driller/Helper:	Vince Pokrywka Richard Ryon
(11) Drilling Method:	Direct-Push
(12) Sample Method:	Hand-auger & Direct-Push
(13) Hammer Weight/Drop:	N/A
(14) Bentonite Gel Used:	N/A
(15) Borehole Diameter, Pilot:	3 3/4-inch
Final:	2 1/4-inch
(16) Borehole Started, Time/Date:	1155 / 8/15/11
(17) Borehole Completed, Time/Date:	1220 / 8/15/11
(18) Water Source:	B419 area hydrant
(19) Well Started, Time/Date:	No well installed
(20) Well Completed, Time/Date:	N/A
(21) Well Head Completion	N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

ABBREVIATIONS: ------ = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth:	16.0 ft
(24) Casing Depth:	N/A
(25) Screened Interval:	N/A
(26) Sand Pack, #3	N/A
#0/30:	N/A
(27) Well Development Method:	N/A
Time: —	Date: —
Flow Rate:	—
(28) Geophysical Logs, Type:	N/A
By: —	Date —
(29) Circulation:	N/A

(30) OVA/PID Field Readings (ppm)	Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
														Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels
			Concrete Coring		0.5/0.5								Concrete	(0.0-0.5) Concrete slab. (0.5'-14") Fill 6"
					Washed Away NR						1	NR	Fill	7/27/2011 refusal at 14 inches from driller, 2nd concrete 8/8/2011, core 2nd concrete slab, 14"-20" thick slab 14
			Concrete Coring		0.5/0.5								Concrete	(14"-20") Concrete slab, 2nd 20"
			HA to 3.0'		1.33		2F 11:58		Type II-V Portland Cement Grout		2		Silty Clay	(20" - 4.5) Silty Clay (CL), brown (10YR 4/3), med, damp, 10% vf-vc sand trace gravels to 3/4-inch, LEK
											3			4.5'
			DP to 4.0'		1.0/1.0						4			(4.5-14.5) Sandy Silt, (ML) brown-yellow (10YR 6/3.5) med, dry, crumb s, 10-20% v-m sand, LEK
			DP to 8.0'		3.3/4.0		5F (12:12)				5			
											6		Sandy Silt	
											7			
											8			
			DP to 12.0'		3.8/4.0						9			@9.0ft, 10-15% SR gravels to 3/4-inch.
											10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-023

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
						-10F (2:25)		Portland Cement Grout		10		Sandy Silt	Sandy Silt (ML), cont'd
										11			
										12			
		DP to 16.0		3.3/4.0						13			
								Type II + V		14			(14.5-16) Sandy Gravel (GP), yel-brn (10YR 6/5), loose-med, dry, SA gravels to 1½-inch, 20-25% vf-vc sd, trace fines L-MEK.
						-15P (12:35)				15		Sandy Gravel	
										16	NR		T.D. = 16.0 ft
										17			
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Note: The numbers listed in parentheses on this log correspond to the [illegible]

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: B419; N; B-419-024; B511

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-024

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McCanlis

(6) Edited By: Mark Buscheck

(7) Project Manager: Valene Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling Martinez CA

(10) Driller/Helper: Vince Pokrywka / Richard Ryan

(11) Drilling Method: Direct-Push

(12) Sample Method: Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 2 1/4-inch Final: 2 1/4-inch

(16) Borehole Started, Time/Date: 10:12 / 8/16/2011

(17) Borehole Completed, Time/Date: 11:00 8/16/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

Notes: Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels.

ABBREVIATIONS: ------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP. Direct-Push

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												Borehole located in sump of B419 Tank Vault.
		DP to 1.0'		0.5 / 1.0				Type II-V Portland Cement Grout				Leaves	(0.0-0.5) Leaves ~0.3'
		DP to 4.0'		2.5 / 3.0		1F (10:25)				1	NR	Silty Sand	(0.5-2.4) Silty Sand (SM), light yel-brn (10YR 6/4) med, damp, vf-vc grained 15-20% fines, L-MEK
						2SF (10:40) Contingency Sample Jars not filled				2			~2.4'
										3		Gravelly Sand	(2.4-4.0) Gravelly Sand (SM/SW) brn (10YR 7/3), loose, dry, vf-vc grained, 10-15% SA gravels to 1/2-inch, 10% fines, MEK. ~4.0'
										4	NR		
		DP to 8.0'		3.4 / 4.0		5F (10:50)				5		Clayey Silt	(4.0-7.8) Clayey Silt (ML), brown (10YR 5/3), firm, damp, low plasticity, LEK.
										6			~7.8'
										7		Gravelly Sand	(7.8-9.4) Gravelly Sand (SM) yel-brn, (10YR 5/3), med, damp, vf-vc grained, 10-15% SA gravels to 3/8-inch, 10-15% fines, MEK ~9.4'
										8	NR		
		DP to 12.0'		4.0 / 4.0						9		Clayey Silt	(9.4-11) Clayey Silt (ML), as above at 4.0 to 7.8 ft.
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud), dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid, S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very, w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
						10F (11:04)		Type II-V Portland Cement Grout		10		Clayey Silt
										11		Silty Sand
		DP to 12.0'		3.7/4.0						12		
										13		Silty Clay
										14		
										15		
						15F (11:18)				16	NR	
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-024

Notes:

Clayey Silt (ML), cont'd

11.

(11-12.7) Silty Sand (SM) yel-brown (10YR 4/3), med, damp, vf-c grained, 10-15% fines, MEK

12.

(12.7-16) Silty Clay (CL), yellow-brown (10YR 4/3), med to stiff, moist, low plasticity, LEK; caliche at 15.6 ft

T.D. = 16.0 ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N

B419

B511

B-419-024A

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-024A

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Marrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gress Drilling

(10) Driller/Helper: Vince Pokrywka / Armando Torres

(11) Drilling Method: Direct-Push

(12) Sample Method: Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 2 1/4-inch Final: 2 1/4-inch

(16) Borehole Started, Time/Date: 8:29 / 8/22/2011

(17) Borehole Completed, Time/Date: 8:45 / 8/22/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth				
Time				
Date				

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 13.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: Date: Flow Rate:

(28) Geophysical Logs, Type: N/A By: Date

(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		DA to 10.0'						Type II-V Portland Cement Grout		1		Asphalt	(0.-0.3) Asphalt surface 0.3'
										2			Sample location is outside of B419 tank vault, next to B-419-024. Borehole is drilled to collect missing sample volume at equivalent depth of 2ft at B-419-024 (Not enough sample volume was collected for B-419-024-2F).
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity, 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very, w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-024A

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
		DP 10' to 13'		2.8 / 3.0		-2F (8:39)		Type II-V Portland Cement Grout		10			(10-12.8) Gravelly Sand (SM/SW) yel-brn (10YR 5/4) med, dry, vf-vc grained, 10-20% SA-SR gravels to 1.5 inches, 5% fines, MEK.
										11			
										12			
										13			TD = 13.0 ft
										14			
										15			
										16			
										17			
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: SEE ATTACHED MAP	(2) Project: LLNL 5200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-025
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. BUSCHECK
	(7) Project Manager: V. Morrow	(8) Drill Rig: Mari M2-5T
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Eric Stebellon / Rich Ryon	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: No
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 0943 / 9/28/10	(17) Borehole Completed, Time/Date: 1008 / 9/28/10 — (18) Water Source: N/A
Notes: DRILLED BY GEOPROBE SOIL BORING ONLY - NO WELL	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: NO WATER	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 17 — (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A — #0/30: N/A
(27) Well Development Method: N/A
Time: Date: Flow Rate:
(28) Geophysical Logs, Type: N/A — (29) Circulation: N/A
By: Date

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
													Hand Auger 0 to 5' bgs
		HA				B-419-025-0F	B-419-025-DUP-0F					AC/AB	1" AC on 11" AB
										1			
						B-419-025-1F	B-419-025-DUP-1F					AB/ML (Fill)	(1 - 3) mixture of AB and sandy silt (ML)
										2			dark brown (7.5YR 3/3) soft, moist, f. sand
													SR-SA, 80% Silt, 20% sand, LEK (trench
										3			backfill)
						B-419-025-3F	B-419-025-DUP-3F					ML	(3 - 9') Sandy Silt (ML) dark brown (7.5YR 3/3)
										4			m. dense, moist, f. sand, SR-SA,
													80% silt 20% sand LEK
										5			
		DP 5		42/48							X		
										6	X		
						B-419-025-6F					X		
										7	X		
											X		
										8	X		
											X		
										9	NR		(9 - 13) Silty Sand (SM) brown (7.5YR 4/3)
		DP 9		42/48							X	SM	m. dense, moist, f. sand, SR-SA, 85% Sand
										10	X		15% silt, MEK.

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-025

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 Cont.		42/48 Cont							X	SM	SILTY SAND (SM) As Above
											X		
						B-419-025-11F				1	X		
											X		
										2	X		
											X		
										3	NR		
		DP 13		48/48							X	GP	(13-17) Sandy Gravel (GP) light yellowish brown
											X		(2.5Y 6/3), m. dense, moist, f. to c. sand
										4	X		and gravel, SR-SA, 60% gravel, 40% sand HEK
											X		
										5	X		
											X		
										6	X		
						B-419-025-16F					X		
										7	X		T.D = 17 1008 9/28/10 (AN)
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

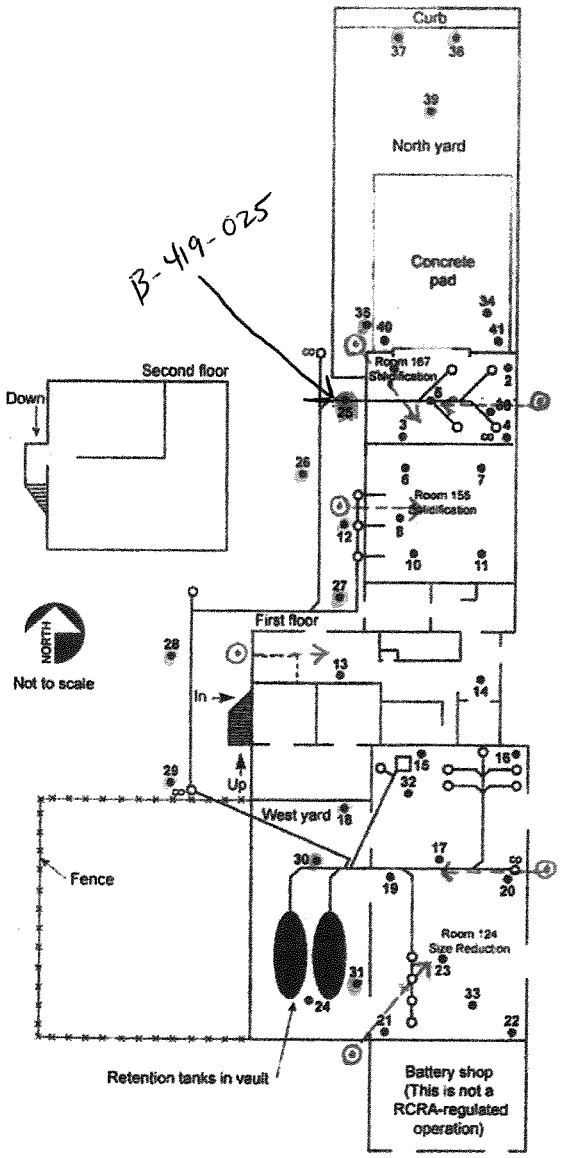

Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: See Attached Map	(2) Project: LLNL S200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-026
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. Buschelle
	(7) Project Manager: V. Morrow	(8) Drill Rig: Mari M2.5T
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Eric Santellan / Rich Ryon	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: none
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 1053 / 9/28/10	(17) Borehole Completed, Time/Date: 1122 / 9/28/10 — (18) Water Source: N/A
Notes: DRILLED BY GEOPROBE Soil Boring Only - No Well	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: NO WATER	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ——— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 17 — (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A — #0/30: N/A
(27) Well Development Method: N/A
Time: — Date: — Flow Rate:
(28) Geophysical Logs, Type: N/A — (29) Circulation: N/A
By: — Date

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
													Hand Auger 0' to 5' bgs.
		HA				B-419-026-0F						AC/AB	Boring location moved 2' South of original location
										1			1" AC on 11" AB
						B-419-026-1F						ML	(1-9) Sandy Silt (ML) reddish brown
										2			(5YR 4/4) m. stiff, moist, f. sand, SR-SA
													80% Silt, 20% sand LEK
										3			
						B-419-026-3F + QC Volume							
										4			
										5			
		DP 5		40/48							X		
										6	X		
						B-419-026-6F					X		
										7	X		
											X		
										8	X		
											NR		
										9			(9-17) Sandy Gravel (GP) light yellowish brown
		DP 9		48/48							X	GP	(2.5Y 6/4), m. dense, moist, f to c sand and
										10	X		gravel, SR-SA, 65% gravel, 35% sand, HEK

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; Ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; Yw = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-026

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
		DP 9 cont.		48/48 cont							X	GP	SANDY GRAVEL (GP) As ABOVE
										1	X		
						B-419-026-11F					X		
										2	X		
											X		
										3	X		
		DP 13		48/48							X		
										4	X		
											X		
										5	X		
											X		
										6	X		
						B-419-026-16F					X		
										7	X		T.D=17 1122 9/28/10 AN
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

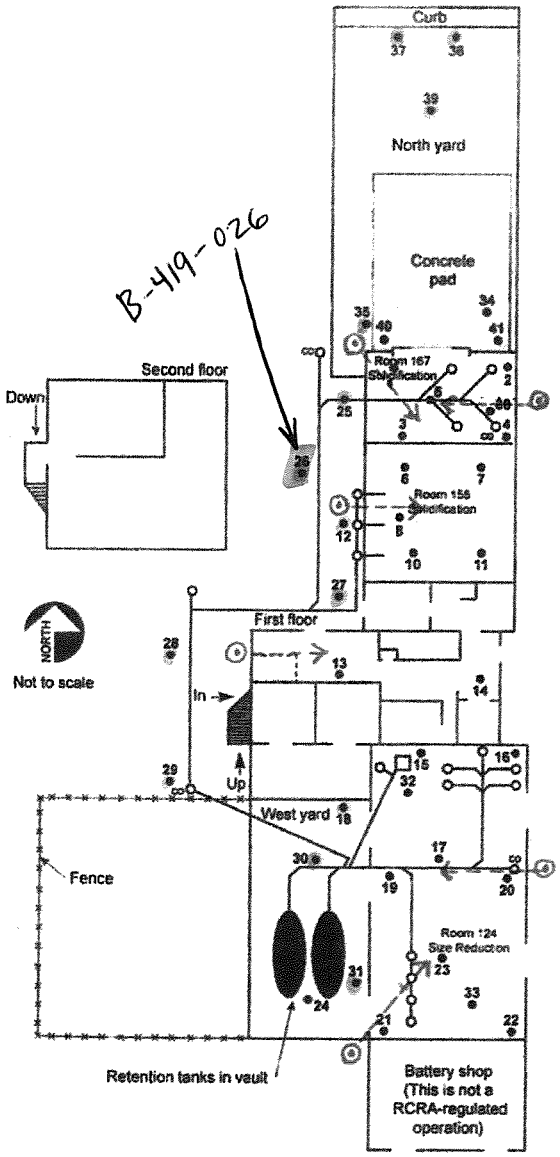

Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: SEE ATTACHED MAP	(2) Project: LLNL S200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-027
		(4) Job No.: 33824 · B419.33
	(5) Logged By: Andy Niemand	(6) Edited By: M. BUSCHELLE
	(7) Project Manager: Vi Morrow	(8) Drill Rig: Mari M2.5T
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Ferre Santellan Rich Ryan	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: none
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 0926 / 9/29/10	(17) Borehole Completed, Time/Date: 0952 / 9/29/10 — (18) Water Source: N/A
Notes: DRILLED BY GEOPROBE SOIL BORING DUY-JOWEN	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: NO WATER	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ——— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 17' — (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A — #0/30: N/A
(27) Well Development Method: N/A
Time: — Date: — Flow Rate:
(28) Geophysical Logs, Type: N/A — (29) Circulation: N/A
By: — Date

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD)	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
													Hand Auger 0 to 5' bgs
		HA				B-419-027-0F						AC/AB	1" AC on 11" AB
										1			
						B-419-027-1F						ML	(1-7) Sandy Silt (ML) brown (7.5YR 4/3)
										2			m, stiff, moist, f. sand, SR-SA, 80%
													Silt, 20% sand LEK
										3			
						B-419-027-3F							
										4			
										5			
		DP 5		48/48							X		
										6	X		
						B-419-027-6F					X		
										7	X		
											X	GP	(7-17) Sandy Gravel (GP) light olive brown
										8	X		(2.5Y 5/4), m. dense, moist, f to c sand
											X		and gravel, SR-SA, 65% gravel, 35% sand
										9	X		LEK
		DP 9		48/48							X		
										10	X		

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-027

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 Cont		48/48 Cont							X	GP	SANDY GRAVEL (GP) AS ABOVE
										1	X		
						B-419-027-11F					X		
										2	X		
											X		
										3	X		
		DP 13		48/48							X		
										4	X		
											X		
										5	X		
											X		
										6	X		
						B-419-027-16F					X		
										7	X		T.D = 17 0952 9/29/10 AW
										8			
										9			
										20			
										1			
										2			
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										9			
										0			

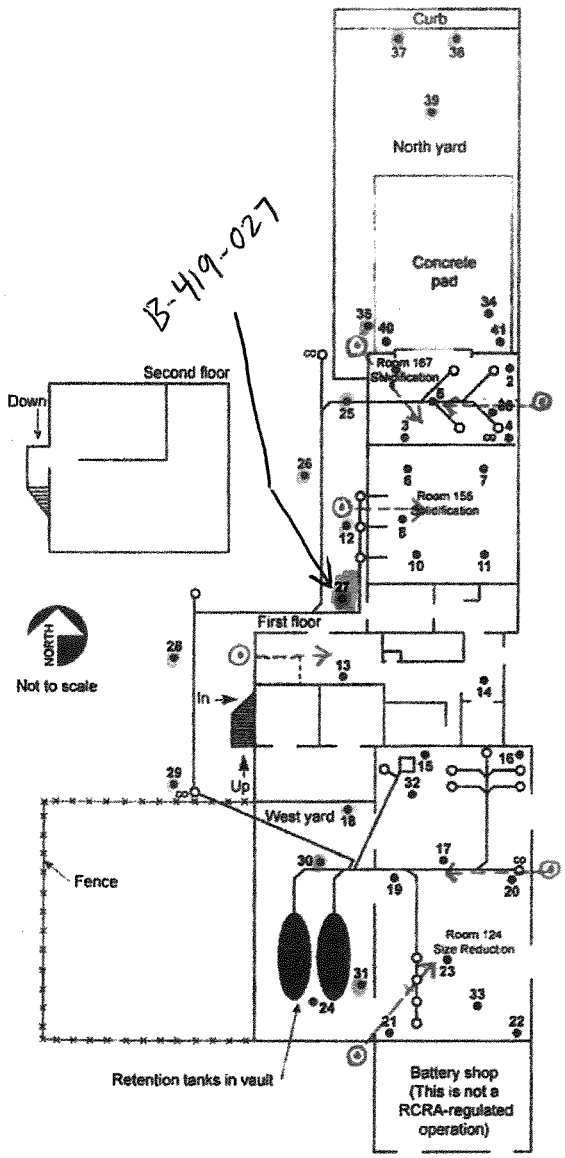

Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: SEE ATTACHED MAP	(2) Project: LLNL S200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-028
		(4) Job No.: 33824 · B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. BUSCHECK
	(7) Project Manager: V. Morrow	(8) Drill Rig: Marl M2.5T
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Eric Santellan / Rich Ryan	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: None
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 1032 / 9/29/10	(17) Borehole Completed, Time/Date: 1052 / 9/29/10 — (18) Water Source: N/A
Notes: DRILLED BY GEOPROBE Soil Boring Only - Abbott	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: NO WATER	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 17' — (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A — #0/30: N/A
(27) Well Development Method: N/A
Time: Date: Flow Rate:
(28) Geophysical Logs, Type: N/A — (29) Circulation: N/A
By: Date

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD)	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												Hand Auger 0 to 5' bgs.
		HA				B-419-028-OF	B-419-028-DUP-OF					AC/AB	1" AC on 11" AB
										1			(1-5) Sandy Silt (ML) brown (7.5YR 4/4)
						B-419-028-1F	B-419-028-DUP-1F					ML	m. stiff, moist, f sand, SR-SA, 80%
										2			silt, 20% sand, LEK
										3			
						B-419-028-3F	B-419-028-DUP-3F			4			
										5			
		DP 5		48/48							X	SM	(5-9) Silty Sand (SM) brown (10YR 4/3)
										6	X		m. dense, moist, f, sand, SR-SA, 80%
						B-419-028-6F					X		sand, 20% silt, MEK
										7	X		
											X		
										8	X		
											X		
										9	X		(9-17) Sandy Gravel (GP) light yellowish brown
		DP 9		42/48							X	GP	(2.5Y 6/4), m. dense, moist, f to c sand and
										10	X		gravel, SR-SA, 65% gravel, 35% sand, MEK

Note: Numbers **1–42** listed on this log correspond to Subsections **6.4.1–6.4.42** of SOP 1.1.

—— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-028

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 Cont.		42/48 Cont.							X	GP	SANDY GRAVEL (GP) AS ABOVE
										1	X		
						B-419-028-11F					X		
										2	X		
											X		
										3	NR		
		DP 13		48/48							X		
										4	X		
											X		
										5	X		
											X		
										6	X		
						B-419-028-16F					X		
										7	X		T.D. 17' 1052 9/29/10 AN
										8			
										9			
										20			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

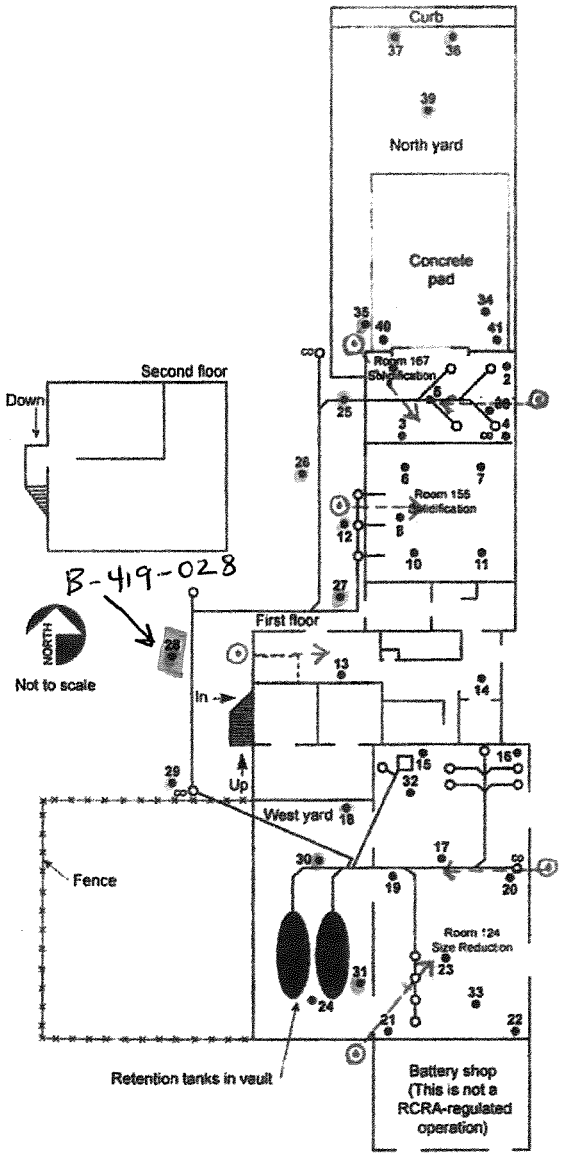

Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: See Attached Map	(2) Project: LLNL 5200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-029
		(4) Job No.: 33824 · B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. Buschell
	(7) Project Manager: Vi Morrow	(8) Drill Rig: Mar/ MZ.5T
	(9) Drilling Contractor: Gregg Drilling Martinez, CA	
	(10) Driller/Helper: Eric Santellan / Rick Ryon	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: none
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 1217 9/29/10	(17) Borehole Completed, Time/Date: 1232 9/29/10 — (18) Water Source: N/A
Notes: Drilled By Geoprobe Soil Boring Only - No Well	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: NO WATER	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 17'	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: Date:	Flow Rate:
(28) Geophysical Logs, Type: N/A By: Date	(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
													Hand Auger 0 to 5' bgs.
		HA				B-419-029-0F						AC/AB	1" Ac on 11" AB
										1			
						B-419-029-1F						ML	(1-5) Sandy Silt (ML) dark brown (7.5YR 3/3)
										2			m. stiff, moist, f. sand, SR-SA, 80%
													Silt, 20% sandy LEK
										3			
						B-419-029-3F							
										4			
										5			
		DP 5		40/48							X	SM	(5-9) Silty Sand (SM) brown (10YR 4/3)
										6	X		m. dense, moist, f. sand, SR-SA, 80%
						B-419-029-6F					X		Sand, 20% silt, LEK
										7	X		
											X		
										8	X		
											X		
											NR		(9-17) Sandy Gravel (GP) light olive brown
		DP 9		42/48						9	X	GP	(2.5Y 5/4), m. dense, moist, f to c sand and gravel,
										10	X		SR-SA, 60% gravel, 40% sand LEK

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; yw = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-029

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 cont.		42/48 cont.							X	GP	
										1	X		
						B-419-029-11F					X		
										2	X		
											X		
										3	NR		
		DP 13		48/48							X		
										4	X		
											X		
										5	X		
											X		
										6	X		
						B-419-029-16F					X		
										7	X		TD = 17' 1232 9/29/10 WAN.
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

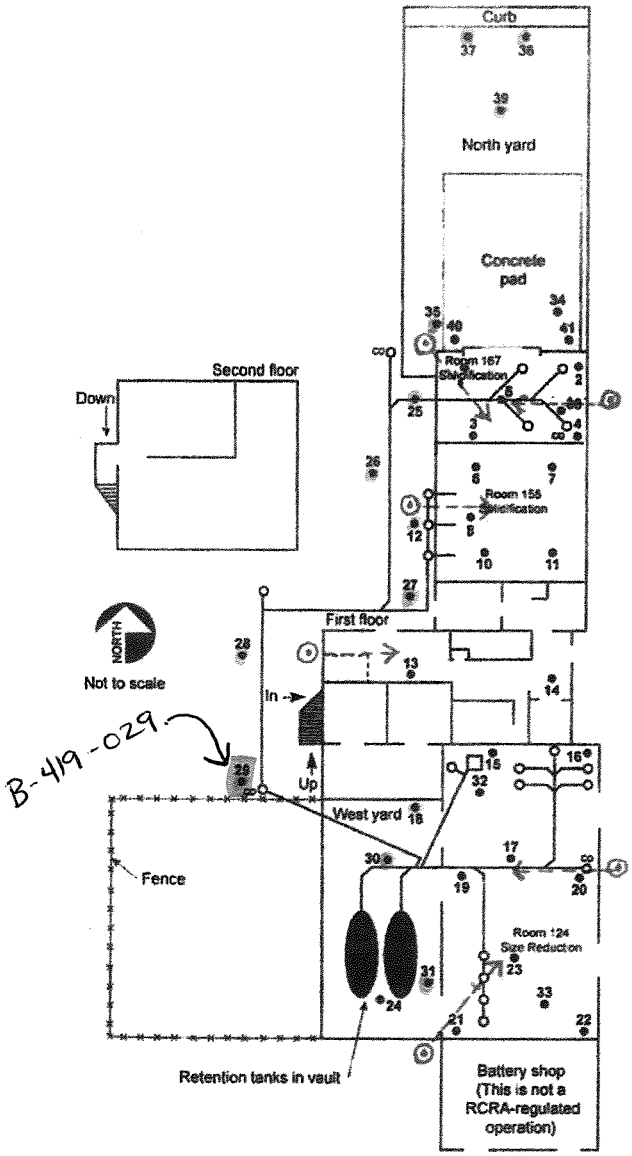

Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: SEE ATTACHED MAP	(2) Project: LLNL 5200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-030
		(4) Job No.: 33824 · B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. BUSCHECK
	(7) Project Manager: V. Morrow	(8) Drill Rig: Mori M2-5T
	(9) Drilling Contractor: Gregg Drilling Martinez, CA	
	(10) Driller/Helper: Eric Stakellen / Rich Ryan	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 1331 / 9/30/10	(17) Borehole Completed, Time/Date: 1402 / 9/30/10 — (18) Water Source: N/A
Notes: DRILLED BY GEOPROBE SOIL BORING ONLY - NO WELL	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth / Boring/Casing Depth / Time / Date: NO WATER	(21) Well Head Completion: N/A

ABBREVIATIONS: ——— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 17 — (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A #0/30: N/A
(27) Well Development Method: N/A
Time: Date: Flow Rate:
(28) Geophysical Logs, Type: N/A By: Date — (29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		HA				B-419-030-0F				1		AC/AB	1" AC on 11" AB
						B-419-030-1F				2		ML	(1-5) Sandy Silt (ML) Brown (7.5YR 4/3) m stiff, moist, f. sand, SR-SA, 85% Silt, 15% sand, LEK
										3			
						B-419-030-3F	+ GC Volume			4			
										5			
		DP 5		48/48						6		GP	(5-14) Sandy Gravel (GP) light yellowish brown (2.5Y 6/3), m dense, moist, f to c sand and gravel, SR-SA, 65% Gravel 35% sand, HEK
						B-419-030-6F				7			
										8			
										9			
		DP 9		48/48						10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(2) Project: LENL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-030

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 cont		48/48 cont.							X	GP	SANDY GRAVEL (GP) As Above
										1	X		
						B-419-030-11F					X		
										2	X		
											X		
										3	X		
		DP 13		48/48							X		
										4	X		
											X	Sm	(14-17) Silty Sand (Sm) pale yellow (2.5Y 7/3)
										5	X		m. stiff, moist, f. sand, SR-SA, 65% sand 35%
											X		silt, LEK.
										6	X		
						B-419-030-16F					X		
										7	X		
													TD=17' 1402 9/30/10 (AN).
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

Borehole/Well Construction Log

(1) BORHOLE LOCATION

N

B419

B511

B-419-031

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-031
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Merrow	(8) Drill Rig: MARL M2.50P
(9) Drilling Contractor: Gregg Drilling, Martinez, CA	
(10) Driller/Helper: Vince Pokrywka / Richard Ryan	
(11) Drilling Method: Direct-Push	(12) Sample Method: Hand auger & Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used:
(15) Borehole Diameter, Pilot: 3¾-in : 0.6-3'	Final: 2¼-inch : 3-16'
(16) Borehole Started, Time/Date: 9:10 / 8/17/2011	(17) Borehole Completed, Time/Date: 9:40 8/17/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A
(21) Well Head Completion: N/A	

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

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(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date —	

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α β, gamma at bkgd levels

(38) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Coring		0.6/0.6		-0F		Grout				Concrete	(0.0-0.6) Concrete slab -0.6
		HA to 3.0'		2.4/2.4		-1F (9:15)				1		Silty Sand	(0.6-2.5) Silty Sand (SM), yellow-brn (10YR 4/3), med., damp, vf-c grained, 20-30% fines, L-MEK. -2.5
						-2F (9:25)				2			
		DP to 4.0'		1.0/1.0				Portland Cement		3		Sandy Silt	(2.5-4.2) Sandy Silt (ML) yel-brn, (10Y 4/3), med, damp, 10-20% vf-m sand, low plasticity, LEK. -4.2'
		DP to 8.0'		2.8/4.0						4			
						-5F (9:44)				5		Gravelly Sand	(4.2-16.0) Gravelly Sand (SW) yel brn (10YR 5/4), med, damp, vf-vc grained 10-20% SA-SR gravels to 1½ inch, L-MEK.
								Type II-V		6			
										7	NR		
										8			
		DP to 12.0'		3.0/4.0						9			@9.5ft, yel-brn sandy silt interbed.
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity, 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

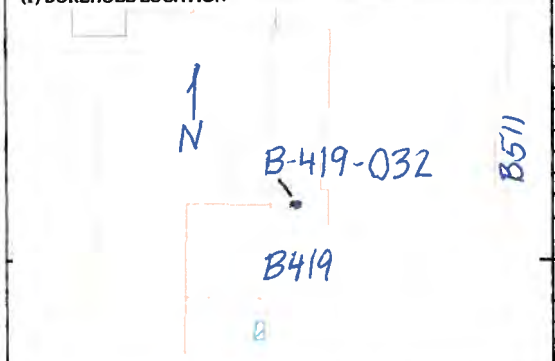
(3) Borehole/Well No.: B-419-031

Notes:

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Fill/	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
										10			Gravelly Sand (SW), cont'd
						10F (9:51)		Type II-V Portland Cement Grout					
										11	NR	Gravelly Sand	
										12			
		DP to 16.0'		4.0/4.0									
										13		Sandy Silt	@ 12.75 – 13.6 ft, sandy silt interbed.
										14		Gravelly Sand	
										15			
						15F (10:00)				16			
										17			T.D. = 16.0 ft.
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-032
	(4) Job No.: 33824-B419.5.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M2.5DP
(9) Drilling Contractor: Gregg Drilling, Martinez, CA	
(10) Driller/Helper: Armando Torres / Richard Ryan	
(11) Drilling Method: Direct-Push	(12) Sample Method: Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inches	Final: 2 1/4-inches
(16) Borehole Started, Time/Date: 12:30 8/1/2011	(17) Borehole Completed, Time/Date: 13:20 8/1/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date —	

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		Concrete Coring		0.75 / 0.75		-COMP -004		Type II-V Portland Cement Grout				Concrete	(0-0.75) Concrete Slab -0.75
		DP to 4.0'		1.45 / 3.25		-0.8F (12:45)				1		Gravel	(0.75-1.0) Sandy Gravel (GP/GM), gray brn (10YR 6/2), loose, damp, SR gravels to 0.25 inch 20-30% vf-vc sand, 10% fines, MEK -1.0
					Not enough soil recovered for -2ft sample					2			
											NR	Clayey Silt	
										3			
										4			
		DP to 8.0'		1.6 / 4.0		-5F (12:52)				5			(1.0-5.1) Clayey Silt (ML), yellow brown (10YR 4/4), med, damp, low plasticity, 20% vf-f sand, LEK -5.
										6	NR	Silty Sand	(5.1-8.0) Silty Sand (SM), yellow-brn (10YR 4/4), loose, damp, vf-c grained, 10-15% fines, MEK.
										7			
										8			-8.0'
		DP to 12.0'		3.0 / 4.0						9		Sand	(8-9.0) Sand (SP), lt. yellow-brn (2.5Y 6/3) med, dry, vf-m grained, trace C sand and SA gravels to 0.25-inch, LEK.
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-032

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
					-10F (13:00)			Portland Cement Grout		10		Sand	(9.0-12.0) Sand (SP) light yel-brown, (10YR 6/4), loose, damp-dry, f-m grained, trace SA gravels to 0.25 inch, L-MEK.
										11	NR		
										12			12.0
		DP to 16.0		4.0 / 4.0				Type II-V		12		Sandy Gravel	(12-15) Sandy Gravel (GM), light brn-gray (10YR 6/2), loose, dry, SR gravels to 0.25-inch 20-30% vf-m sand, 10-15% fines, MEK
										13			
										14			
					-15F (13:10) -DUP-15F (13:12)					15			15.0'
										16		Clayey Silt	(15-16) Clayey Silt, (ML) yel-brn (10YR 5/4) med, damp, low plasticity, LEK.
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N

B-419-032A

B511

B419

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-032A
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Ruscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: N/A
(9) Drilling Contractor: Gregg Drilling / Martinez, CA	
(10) Driller/Helper: Armando Torres / Richard Ryan	
(11) Drilling Method: Hand-auger	(12) Sample Method: Hand-auger
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 3 3/4-inch	Final: 3 3/4-inch
(16) Borehole Started, Time/Date: 8:50 / 9/19/2011	(17) Borehole Completed, Time/Date: 8:56 / 9/19/11
	(18) Water Source: B438 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A
(21) Well Head Completion: N/A	

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization, MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

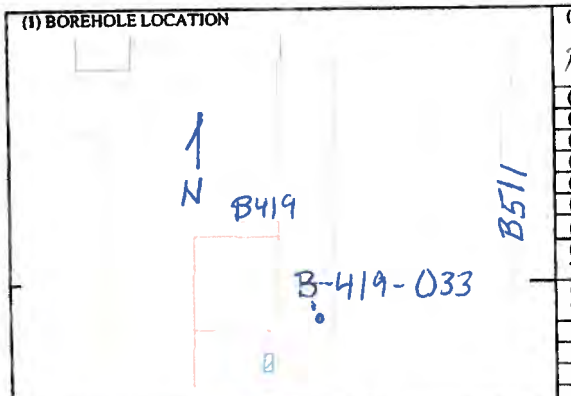
(23) Total Depth: 3.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —	(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β and gamma at bkgd levels
		Trench Cut										Concrete	(0-0.6) Concrete slab ⌐0.6
		HA to 3.0'		2.4 / 2.4						1		Sandy Gravel	(0.6-1.5) Sandy Gravel (GP), gray (2.5Y 6/2), dense, moist, SA-SR gravels to 3/4-inch, 10-20% vf-vc sand MEK. ⌐1.5'
						2F (8:55)				2		Sandy Clay	(1.5-3.0) Sandy Clay (CL) yellow-brown (10YR 5/4), med, damp, 10-15% vf-f sand, low plasticity, LEK
										3			T.D = 3.0 ft
										4			
										5			
										6			Note: Borehole was hand augered in area of Rm 124 pipeline trench cut. Soil sample at 2 feet was collected to correspond with missing interval at location B-419-032. Sufficient soil amount was not recovered at (B-419-032) 2-ft interval.
										7			
										8			
										9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation

(3) Borehole/Well No.: B-419-033

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McCombe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling / Martinez, CA

(10) Driller/Helper: Vince Pokrywka / Richard Ryan

(11) Drilling Method: HA: 1.6'-3'; DP: 3'-16'

(12) Sample Method: Hand auger: 1.6'-3'; Direct-Push: 3'-16'

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 1.6'-3'

Final: 2 1/4: 3'-16'

(16) Borehole Started, Time/Date: 8:40 / 8/15/2011

(17) Borehole Completed, Time/Date: 9:25 / 8/15/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. HA: Hand-auger; DP: Direct-Push

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm)	Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
			Concrete Coring		0.5/0.5		-COMP-004		Type II-V Portland Cement Grout				Concrete	(0-0.5) Concrete slab
											1	NR	Fill	(0.5-1.17) Fill, washed away during concrete c-ring; (1.17-1.6) Concrete slab, second ~1.6'
			Concrete Coring		0.5/0.5		-COMP-004A						Concrete	(1.6-2.0) Sandy Silt (ML) yel-brn,
			HA		1.4/		-1.6F				2		S. Silt	(10YR 4/3), med, damp 15-25% vf
			to 3.0'		1.4		-2F						Silty Sand	-m sand, trace SA gravels 3/4-inch 2.0
											3			(2.0-4.0) Silty Sand (SM) yel-brn
			DP to 4.0'		0.5/1.0									(10YR 4/3), med, damp, v-m grained
											4	NR		15-25% fines 5-10% SA gravels to 3/4 inch
			DP to 8.0'		2.7/4.0									crumbles LEK-M. 4.0
											5		Sandy Silt	(4.0-5.7) Sandy Silt (ML) yel-brown
							-5F							(10YR 4/3), med, damp 10-20% vf-f sand,
											6			tight, slightly plastic, LEK. 5.7
											7	NR	Gravelly Sand	(5.7-16) Gravelly Sand (SW),
														yel-brown (10YR 6/4) med, dry, vf-vc
											8			grained, 10-15% SA gravels to 3/8 inch,
			DP to 12.0'		3.7/4.0									MEK.
											9			
											10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
					~10F (9:30)			Type II-V Portland Cement Grout		10		Gravelly Sand
										11		
										12	NR	
		DP to 16.0		3.8 / 4.0								
										13		
										14		
										15		
					~15F (9:40)					16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-033

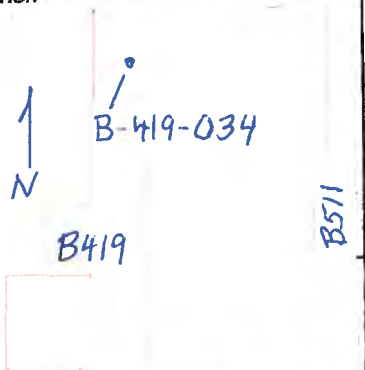
Notes:

@10 ft SA-SR gravels to 1-inch, Gravelly Sand (SW), cont'd.

T.D = 16.0 ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation	(3) Borehole/Well No.: B-419-034
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConibe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Murray	(8) Drill Rig: MARL M2.5 DP
(9) Drilling Contractor: Grego Drilling / Martinez, CA	
(10) Driller/Helper: Vince Pokrywka / Richard Ryan	
(11) Drilling Method: Hand auger: 0.6-3'; DP: 3-16'	(12) Sample Method: Hand-auger and Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 3 3/4-inch: 0.6'-3'	Final: 2 1/4-inch: 3'-16'
(16) Borehole Started, Time/Date: 10:15 / 8/17/11	(17) Borehole Completed, Time/Date: 10:45 / 8/17/11 — (18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date —	

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm3 with Hg sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm)	Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) Lithologic Description
			Concrete Coring		0.6/0.6		COMP-001		Type II-V Portland Cement Grout				Concrete	(0-0.6) Concrete slab — 0.6'
			HA to 3.0'		2.4/2.4		1F 10:20				1		Sandy Silt	(0.6-4.2) Sandy Silt (ML) gray brn (2.5Y 4/3) med, damp, 15-25% vf-m sand, 10-15% SA gravels to 3/8 inch, LEK.
							2F 10:30				2			
							DUP 2.0F (10:35)				3			4.2'
			DP to 4.0'		1.0/1.0						4		Gravelly Sand	(4.2-16.0) Gravelly Sand (SM/SW), yel-brn (10YR 6/4) med, damp, vf-vc grained, 10-20% SA-SR gravels to 1 1/2 inches, 5% fines, 2-1 hlcs of sandy silt, L-MEK.
			DP to 8.0'		4.0/4.0						5			
							5F (10:44)				6			
											7			
											8			
			DP to 12.0'		3.5/4.0						9			
											10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity, 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse, calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high, HF = healed fracture; HIF = handling induced fracture; ind = indurated, K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded, RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-034

Notes:

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
						10F (10:54)		Type II Portland Cement Grout		10		Gravelly Sand
										11		
										12	NR	
		DP to 16.0'		3.7 4.0						13		
										14		
										15		
						15F (11:00)				16	NR	
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

Gravelly Sand (SM/SW), cont'd

T.D. = 16.0 ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: See Attached Map	(2) Project: LLNL 5200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-035
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. BUSCHEK
	(7) Project Manager: Valerie Morrow	(8) Drill Rig: Mari Mz.5T
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Eric Sanlellan / Rick Ryan	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: none
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 1128 / 9/27/10	(17) Borehole Completed, Time/Date: 1155 / 9/27/10 — (18) Water Source: N/A
Notes: DRILLED BY GEOPROBE SOIL BORING ONLY - NO WELL	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: NO WATER	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ——— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 17'	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time:	Date: Flow Rate:
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By:	Date

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Hand Auger 0 to 5' bgs
		HA				B-419-035-0F						AC/AB	1" AC on 11" AB
										1			
						B-419-035-1F						ML	(1-9) Sandy Silt (ML) dark yellowish brown
										2			(10YR 4/4) m. stiff, moist, f. sand, SR-SA
													80% Silt 20% sand, LEK
										3			
						B-419-035-3F							
										4			
										5			
		DP 5		48/48							X		
										6	X		
						B-419-035-6F					X		
										7	X		
											X		
										8	X		
											X		
										9	X		(9-17) Sandy Gravel (GP) light yellowish brown (2.5Y 6/4)
		DP 9		48/48							X	GP	m. dense, moist, f to c sand and gravel, SR-SA
										10	X		70% gravel, 30% sand, HEK

Note: Numbers **1–42** listed on this log correspond to Subsections **6.4.1–6.4.42** of SOP 1.1.

——— = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; y/w = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-035

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 Cont.		48/48 Cont.							X	GP	SANDY GRAVEL AS ABOVE
										1	X		
							B-419-035-11F				X		
										2	X		
											X		
										3	X		
		DP 13		48/48							X		
										4	X		
											X		
										5	X		
											X		
										6	X		
							B-419-035-16F				X		
										7	X		
													T.D = 17' 1155 9/27/10 WAN
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

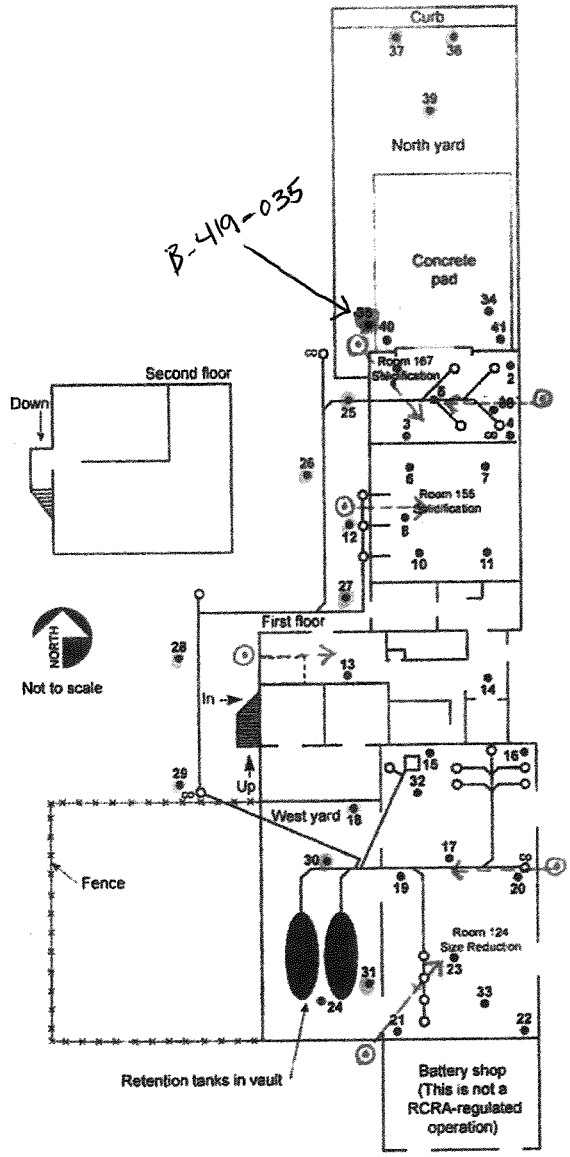


Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION	See Attached Map
(2) Project:	LLNL S200 B419 RCRA Closure
(3) Borehole/Well No.:	B-419-036
(4) Job No.:	33824 419.3.3
(5) Logged By:	Andy Niemand
(6) Edited By:	M. Buschbeck
(7) Project Manager:	V. Morrow
(8) Drill Rig:	Mar 2.5T
(9) Drilling Contractor:	Gregg Drilling Martinez CA
(10) Driller/Helper:	Eric Santellan / Rick Ryan
(11) Drilling Method:	Direct Push
(12) Sample Method:	Grab Sample
(13) Hammer Weight/Drop:	N/A
(14) Bentonite Gel Used:	N/A
(15) Borehole Diameter, Pilot:	2 1/4" Final: N/A
(16) Borehole Started, Time/Date:	1330 / 9/14/10
(17) Borehole Completed, Time/Date:	1425 / 9/14/10
(18) Water Source:	N/A
(19) Well Started, Time/Date:	N/A
(20) Well Completed, Time/Date:	N/A
(22) Water Depth	N/A
Boring/Casing Depth	
Time	
Date	
(21) Well Head Completion	N/A

Notes: Soil Boring Only No Well - Geoprobe

ABBREVIATIONS: ——— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth:	17'
(24) Casing Depth:	N/A
(25) Screened Interval:	N/A
(26) Sand Pack, #3	N/A #0/30: N/A
(27) Well Development Method: Time: Date:	Flow Rate: N/A
(28) Geophysical Logs, Type: By: Date	N/A
(29) Circulation:	N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
													Hand Auger 0 to 5' bgs
		HA				B-419-036-DF						AC/AB	1" AC on 11" AB
						B-419-036-1F				1		ML	(1-5) Sandy Silt (ml) weak red (2.5YR 4/2) m. stiff, moist, f. sand, SR-SA, 80% silt 20% sand LEK.
										2			
										3			
						B-419-036-3F				4			
										5			
		DP 5									X	SM	(5-7.3) Silty Sand (sm) light olive brown (2.5Y 5/6) m. dense, moist f. sand. SR-SA. 70% sand, 30% silt, p. cemented MEK
						B-419-036-6F				6	X		
										7	X		
											X	ML	(7.3-9) Sandy Silt (ml) yellowish red (5YR 5/6) m. stiff, moist, f. sand, SA, 85% silt, 15% sand LEK
										8	X		
											X		(9-13) Silty Sand (sm) yellowish brown m. dense, moist f. sand, SR-SA, 75% sand 25% silt, MEK
		DP 9								9	X	SM	
										10	X		

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; li = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; yiw = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-036

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 cont.		48/48 cont.								SM	SILTY SAND (SM) As Above
						B-419-036-11F				11			
										12			
										13			
		DP 13		48/48								ML	(13-17) Clayey silt (ML) brown (7.5YR 4/4) Moist, moist, 75% silt, 25% clay LEK
										14			
										15			
										16			
						B-419-036-16F				17			
													T.D = 17' 1425 9/14/10 WAN
										8			
										9			
										20			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										30			

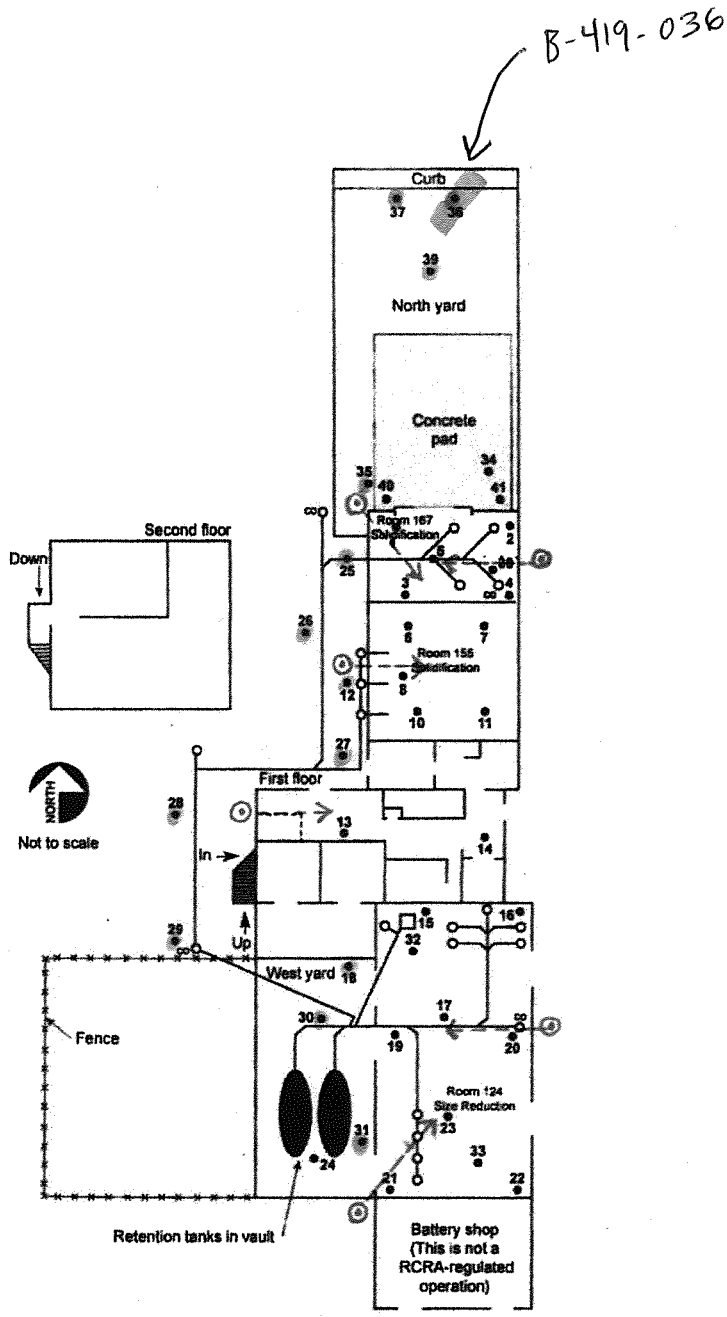


Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION	See Attached Figure
(2) Project:	LLNL S200 B419 RCRA Closure
(3) Borehole/Well No.:	B-419-036A
(4) Job No.:	33824 B419.3.3
(5) Logged By:	Andy Niemand
(6) Edited By:	M Buschelle
(7) Project Manager:	Valerie Morrison
(8) Drill Rig:	Mavl M2-5T
(9) Drilling Contractor:	Gregg Drilling, Martinez CA
(10) Driller/Helper:	Eric Scalcllan / Rich Ryan
(11) Drilling Method:	Direct Push
(12) Sample Method:	GEOPROBE
(13) Hammer Weight/Drop:	N/A
(14) Bentonite Gel Used:	none
(15) Borehole Diameter, Pilot:	N/A
Final:	N/A
(16) Borehole Started, Time/Date:	0853 / 9/27/10
(17) Borehole Completed, Time/Date:	0920 / 9/27/10
(18) Water Source:	
Notes:	Soil Boring Only - abandon
(19) Well Started, Time/Date:	N/A
(20) Well Completed, Time/Date:	N/A
(21) Well Head Completion	N/A

(22) Water Depth	No	water		
Boring/Casing Depth				
Time				
Date				

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth:	17'
(24) Casing Depth:	N/A
(25) Screened Interval:	N/A
(26) Sand Pack, #3	N/A #0/30: N/A
(27) Well Development Method:	N/A
Time: Date:	Flow Rate:
(28) Geophysical Logs, Type:	N/A
(29) Circulation:	N/A
By: Date	

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD)	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Hand Auger 0 to 5' bgs.
		HA				B-419-036A-0F						AC/AB	1" AC on 11" AB
						B-419-036A-1F				1		ML	(1-5) Sandy Silt (ML) very dark grayish brown (10YR 3/2), m. stiff, moist, f. sand, SR-SA, 85% silt, 15% sand LEK
										2			
										3			
						B-419-036A-3F				4			
										5			
		DP 5		48/48								GP	(5-13) Sandy Gravel (GP) olive brown (2.5Y 4/3) m. dense moist, f to c sand and gravel, SR-SA 60% gravel, 40% sand, HEK
						B-419-036A-6F				6			
										7			
										8			
										9			
		DP 9		48/48						10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; M = High; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; Y/w/ = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-036A

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sample Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 cont		48/49 cont							X	GP	Sandy Gravel (GP) As Above
						B-419-036A-HF				1	X		
										2	X		
											X		
										3	X		
		DP 13		48/48							X	ML	(13-17) Sand, Silt (ML) brown (10YR4/3) m. stiff, moist, f. sand, SR., 85% silt, 15% sand, LEK
										4	X		
											X		
										5	X		
											X		
										6	X		
						B-419-036A-HF					X		
										7	X		T.D = 17 0920 9/27/10 WAN
										8			
										9			
										20			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										30			

Notes: Sample Subsections listed in Section 6.4 of SOP 1.1 [i.e. (2) = 6.4.2, etc.]

Borehole/Well Construction Log

(1) BOREHOLE LOCATION	See Attached Map
(2) Project:	LLNL S200 B419 RCRA Closure
(3) Borehole/Well No.:	B-419-037
(4) Job No.:	33824 B419.3.3
(5) Logged By:	Andy Niemand
(6) Edited By:	M. Buschbach
(7) Project Manager:	Vh morrow
(8) Drill Rig:	Mar/M2.5T
(9) Drilling Contractor:	Gregg Drilling / Martinez CA
(10) Driller/Helper:	Eric Santellen Rich Ryan
(11) Drilling Method:	Direct push
(12) Sample Method:	GEOPROBE
(13) Hammer Weight/Drop:	N/A
(14) Bentonite Gel Used:	none
(15) Borehole Diameter, Pilot:	N/A
Final:	N/A
(16) Borehole Started, Time/Date:	1120 / 9/23/10
(17) Borehole Completed, Time/Date:	1145/9/23/10
(18) Water Source:	N/A
Notes:	Drilled by Geoprobe Soil Boring only - no well
(19) Well Started, Time/Date:	N/A
(20) Well Completed, Time/Date:	N/A
(22) Water Depth	NO WATER
Boring/Casing Depth	
Time	
Date	
(21) Well Head Completion	N/A

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth:	17'
(24) Casing Depth:	N/A
(25) Screened Interval:	N/A
(26) Sand Pack, #3	N/A
#0/30:	N/A
(27) Well Development Method:	N/A
Time:	
Date:	
Flow Rate:	
(28) Geophysical Logs, Type:	N/A
By:	
Date	
(29) Circulation:	N/A

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
													Hand Auger 0 to 5' bgs.
		HA				B-419-037-0F	B-419-037-DUP-0F					PC/AB	1" AC on 11" AB
										1		ML	
						B-419-037-1F	B-419-037-DUP-1F						(1-5) Sandy Silt (ML) brown (7.5YR 4/3), m. stiff
										2			moist, f. sand, SR-SA, 85% silt, 15% sand
													LEK
										3			
						B-419-037-3F	B-419-037-DUP-3F						
										4			
										5			
		DP 5		40/48								GP	(5-14) Sandy Gravel (GP) light yellowish brown
										6			(2.5Y 6/4), m. dense, moist, f to c sand and
						B-419-037-6F							gravel, SR-SA, 65% gravel, 35% sand, HEK
										7			
										8			
											NR		
		DP 9		42/48						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

—— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; Y/w = yellow/yellowish.

(2) Project: LLNL 5200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-037

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 Cont.		42/48 cont.							X	GP	SANDY GRAVEL (GP) As ABOVE
										1	X		
						B-419-037-11F					X		
										2	X		
											X		
										3	NR		
		DP 13		48/48							X		
										4	X		
											X	ML	(14-17) Sandy Silt (ml) light olive brown (2.5Y 5/3)
										5	X		m. stiff, moist, f. sand, SR-SA, 80% Silt, 20%
											X		Sand, LEK
										6	X		
						B-419-037-16F					X		
										7	X		T.D = 17', 1145 9/23/10 WAN
										8			
										9			
										20			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										30			

[Subsections listed in Section 6.4 of SOP 1.1 [i.e. (2) = 6.4.2, etc.]

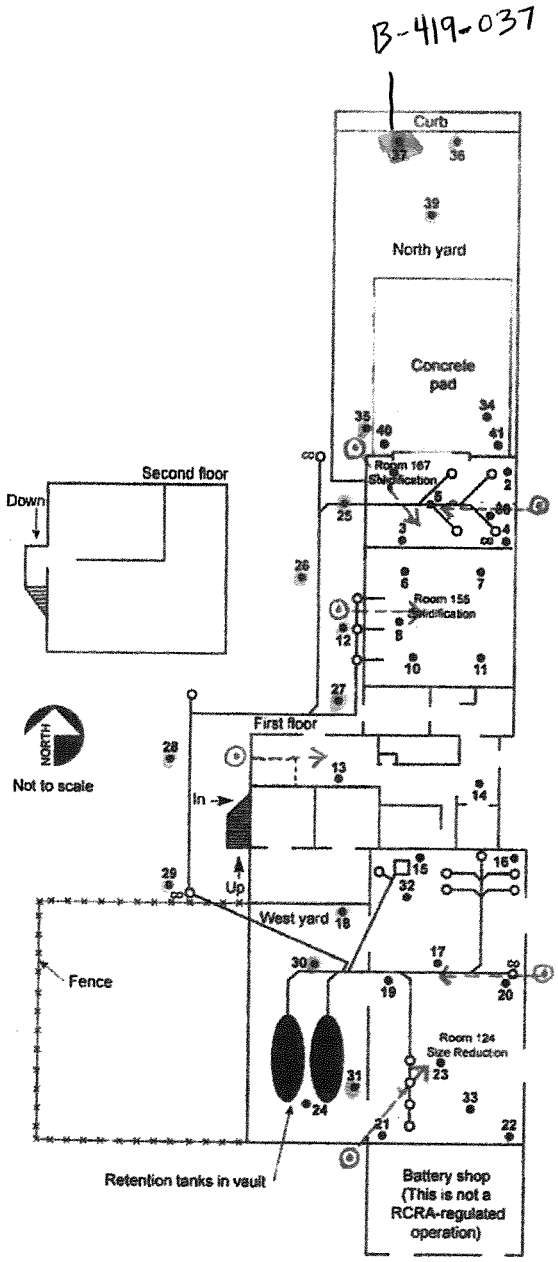
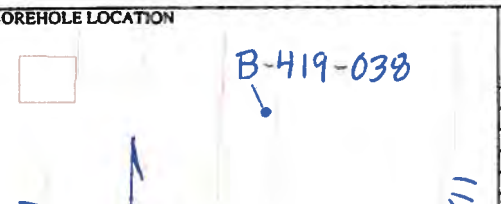


Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-038

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling / Martinez, CA

(10) Driller/Helper: Vince Pokrywka / Armando Torres

(11) Drilling Method: Handauger: 0.5'-4'; DP: 4'-16'

(12) Sample Method: Hand auger & Direct-Push

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch : 0.5'-4' Final: 2 1/4-inch : 4'-16'

(16) Borehole Started, Time/Date: 9:00. 8/24/2011

(17) Borehole Completed, Time/Date: 10:00 8/24/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Coring		0.5/0.5		-COMP -002		Type II-V Portland Cement Grout				Concrete	(0.0-0.5) Concrete slab, old, under slurry? r. -0.5'
		HA to 4.0'		3.5/3.5		-1F (9:04)				1		Gravel	(0.5-1.0) Baserock, SR gravels to 3/4-inch -1.0
										2		Clayey Silt	(1.0-2.0) Clayey Silt (ML), brown (10YR 4/3), med, wet, low plasticity, LEK. -2.0'
						-2F (9:20) -Dup -2.5F (9:25)				3		Clayey Silt	
										4			(2-5.3) Clayey Silt (ML) brown (7.5YR 5/4), stiff, wet, trace c-vc sand low plasticity, LEK -5.3'
		DP to 8.0		3.0/4.0		-5F 9:52				5			(5.3-14.5) Gravelly Sand (SM/SW) light olive brown (2.5Y 5/3), med, moist, vf-vc grained, 20-30% SA gravels to 3/4-inch, 15-20% fines, tight, LEK.
										6		Gravelly Sand	
										7	NR		
										8			
		DP to 12.0'		1.2/4.0		-9F 10:08				9			
										10	NR		

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-038

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 Inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
								Portland Cement Grout		10	NR	Gravelly Sand	
										11			
										12			Gravelly Sand (SM/SW), cont'd
		DP to 16.0'		3.4/4.0						13			
										14			14.5'
								Type II-V		15		Clayey Silt	(14.5 - 16.0) Clayey Silt, (ML) yel-brown (10YR 5/4), stiff, damp, trace m-c sand, tight, low plasticity, LEK
						15F (10.13)				16	NR		
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: SEE ATTACHED MAP	(2) Project: LLNL 5200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-039
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. BUSCHECK
	(7) Project Manager: Valerie Morrow	(8) Drill Rig: Mal M2.5T
	(9) Drilling Contractor: Gregg Drilling	
	(10) Driller/Helper: Eric Santellan / Rick Ryon	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: none
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 0935 / 9/27/10	(17) Borehole Completed, Time/Date: 1005 / 9/27/10 — (18) Water Source:
Notes: DRILLED BY GEOPROBE SOIL BORING ONLY - NO WELL	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: NO WATER	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 17'	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: Time: Date:	Flow Rate: N/A
(28) Geophysical Logs, Type: By: Date: N/A	(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
													Hand Auger 0 to 5' bgs
		HA				B-419-039-0F						AC/AB	1.5" AC on 10.5" AB
										1			
						B-419-039-1F						ML	(1-8) Sandy Silt (ML) light olive brown
										2			(2.5Y 5/3) m. stiff, moist, f. sand, SR-SA
													80% silt, 20% sand, LEK
										3			
						B-419-039-3F							
										4			
										5			
		DP 5		36/48									
										6			
						B-419-039-6F							
										7			
										8			
											NR	GP	(8-17) Sandy Gravel (GP) olive brown (2.5Y 5/3)
										9			m. dense, moist, f to c sand and gravel, SR-SA
		DP 9		48/48									65% gravel, 35% sand HEK
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; yiw = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-039

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
		DP 9 Cont.		48/48 Cont.							X	GP	SANDY GRAVEL (GP) AS ABOVE
										1	X		
						B-419-039-11F					X		
										2	X		
											X		
										3	X		
		DP 13		48/48							X		
										4	X		
											X		
										5	X		
											X		
										6	X		
						B-419-039-16F					X		
										7	X		T.D = 17' 9/27/10 1005 AN
										8			
										9			
										20			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

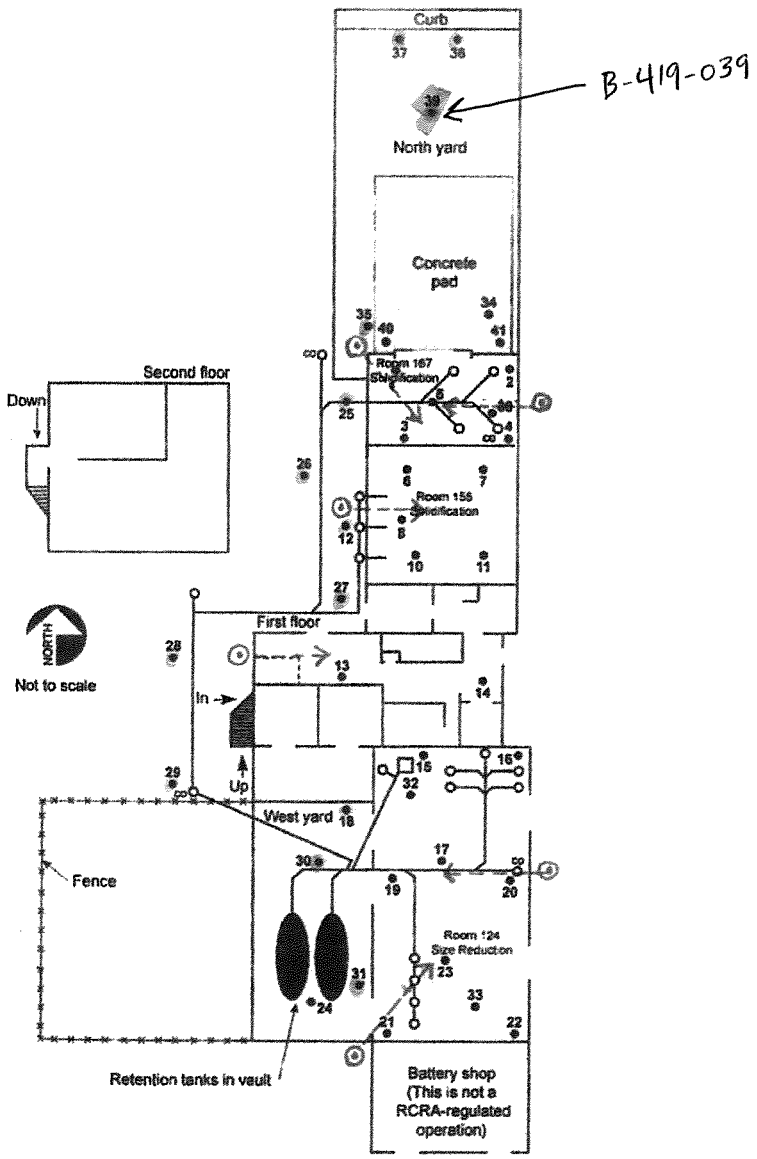
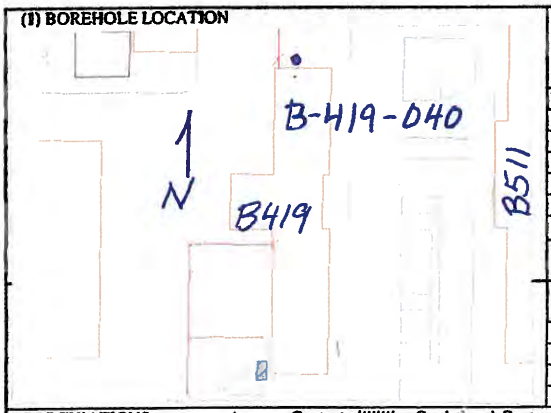


Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-040
	(4) Job No.: 33824-B149.3.3
(5) Logged By: William McLonihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: Mobile Drill B-61
(9) Drilling Contractor: Gregg Drilling Martinez, CA	
(10) Driller/Helper: Eric Santellan / Rick Ryon	
(11) Drilling Method: Hollow-stem auger	(12) Sample Method: Split-spoon every 5-ft interval
(13) Hammer Weight/Drop: 140 lb / 30-inch	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 6-inch	Final: 6-inch
(16) Borehole Started, Time/Date: 8:37 8/30/2011	(17) Borehole Completed, Time/Date: 9:38 8/31/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A
(21) Well Head Completion N/A	

(22) Water Depth	99.65	—	—	—
Boring/Casing Depth	106.0	—	—	—
Time	11:11	—	—	—
Date	8/31/11	—	—	—

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(23) Total Depth: 106.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —	(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		Concrete Coring		0.6/0.6		B-419-COMP-001		Grout				Concrete	(0-0.6) Concrete slab. 0.6'
		DA to 4.5'								1			
										2			
										3			
										4			4.5'
		SP	8	1.5				Type II-V Portland Cement		5		Clayey Silt	(4.5-5.3) Clayey Silt (ML) yellow-brown, (10YR 5/4), med, damp, 10-15% vf-m sand, LEK. -5.3'
		4.5' to 6.0'	18 / 3.0	1.5		-5F (8:50)				6		Gravelly Sand	(5.3-6) Gravelly Sand (SW) yellow brown (10YR 5/4), dense, damp, vf-vc grained, 10-15% SA-SR grands to 1 in. LEK.
		DA to 9.5'								7			
										8			
										9			
		SP	17							10			Gravelly Sand (cont'd)

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-040

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
		9.5 to 11.0'	19 / 25	18/18	-	10F (9:05)		Type II-V Portland Cement Grout		10 / 11		Gravelly Sand	30-40% SA-SR gravels to 1.5 inches
		DA to 14.5'								12			
										13			
										14			
		SP	16	10						15		Sandy Gravel	14.5 (14.5 – 16.3) Sandy Gravel (GP) Yellow brown (10YR 6/4), dense, damp, SA-SR gravels to 1-inch, 20-30% vf-vc sand, MEK.
		14.5 to 16'	19 / 23	18	-	15F (9:16)				16	NR		16.3 (16.3 – 17.5) Silty Sand (SM), light olive brown (2.5Y 5/4), med, damp, vf-m grained, 10-20% fines, L-MEK.
		SP 16' to 17.5'	14 / 17	18/18						17		Silty Sand	
			24										
		DA 17.5' to 19.5'								18 / 19			
		SP	9	18						20		Clayey Silt	19.5 (19.5 – 21) Clayey Silt (ML) light olive brown (2.5Y 5/6), med, damp, trace vf-vc sand, tight, low plasticity, LEK.
		19.5 to 21'	11 / 13	18	-	20F (9:24)				21			
		DA 21' to 24.5								22 / 23			
		SP	8	18						25		Sand	24.5 (24.5 – 26) Sand, (SW), light olive brown, (2.5Y 5/6), med, damp, vf-vc grained, trace fines, MEK
		24.5 to 26'	9 / 11	18	-	25F (9:42)				26			
		DA 26' to 29.5'								27 / 28			
										29			29.5 (29.5 – 31) Clayey Silt (ML) light olive brown (2.5Y 5/4), firm, damp, trace vf-vc sand, brown
		SP	19	18/18						30		Clayey Silt	

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(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-04U

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 Inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysts	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		29.5 to 31	24 / 20	↓		-30F (10:00)		Type II-V Portland Cement Grout		30 / 31		Clayey Silt	caliche, LEK.
		DA to 34.5'								32			
										33			
										34			
		SP	17	8						35	X		@34.5-36 ft, same as above, stiff, tight cream colored caliche.
		34.5 to 36	18 / 26	18 ↓		-35F (10:08)				36			
		DA to 39.5'								37			
										38			
										39			39.5'
		SP	16	18						40	X	Sandy Silt	(39.5-41.0) Sandy Silt, (ML) olive yellow, (2.5Y 6/4), sniff, dry, 10-13% vf-f sand cream colored caliche, blk Mn-O stains to 0.25-inch LEK.
		39.5' to 41'	15 / 23	18 ↓		-40F (10:18)				41			
		DA to 44.5'								42			
										43			
										44			
		SP	18	18						45	X		(44.5-46.0) Sandy Silt (ML), yellow brn, (10YR 5/4), med, dry, 20-30% vf-m sand 10% SA gravels to 0.75 inch, tight, LEK.
		44.5 to 46'	19 / 31	18 ↓		-45F (10:29)				46			
		DA to 49.5								47			
										48			
										49			49.5'
		SP	22	18/18						0	X		(49.5-51.0) Sandy Gravel, (GM/GW) yellow-brn (10YR 5/4), dense-hard, damp, SA SR gravels

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(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-040

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Conditions/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
		49.5 to 51	27 31			-50F (10:40)				50 51		Sandy Gravel	to 2 inches, 20-30% vf-vc sand, 10% fines, LMEK.
		DA to 54.5'								52 53 54			
													54.5'
		SP 54.5' to 56'	17 19 24	18 18		-55F (10:50)				55 56			(54.5 - 56.0) Sandy Silt (ML) yel-brn (10YR 5/4), med, dry, 10-15% vf-f Sand, crumble Mn-O specks, LEK.
		DA to 59.5'						Type II-V Portland Cement Grout		57 58 59		Sandy Silt	
		SP 59.5' to 61'	24 29 36	18/18		-60F (11:06)				60 61			(59.5 - 61.0), Sandy Silt (ML), as above.
		DA to 64.5'								62 63 64			
													64.5'
		SP 64.5 to 66'	18 27 29	18/18		-65F (11:20)				65 66		Gravelly Sand	(64.5 - 66.0) Gravelly Sand (SM/SW) yellow brown (10YR 6/6), dense, dry, vf-vc grained, 20-30% SA-SR gravels to 1-inch, 10% fines, MEK
		DA to 69.5'								67 68 69			
													69.5'
		SP	21	18						70		Clayey Silt	(69.5 - 71.0) Clayey Silt, (ML) light yel-

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(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-040

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
		69.5' to 71.0'	31 39	18		70F (11:33)		Type II-V Portland Cement Grout		70 71		Clayey Silt	brown (2.5Y 6/4), very stiff, dry, trace vf sand, Fe-O stains, LEK
		DA to 74.5'								72			
										73			
										74			74.5'
		SP 74.5' to 76'	27 35 41	18 18		75F (11:48)				75 76		Gravelly Sand	(74.5 - 76.0) Gravelly Sand, (SM/SW) yel-brn (10YR 5/4), dense, dry, vf-vc grained, 10 20% SA-SR gravels to 2+ inches, 10% fines, LEK.
		DA to 79.5'								77			
										78			
										79			79.5'
		SP 79.5' to 81'	19 33 40	18 18		80F (12:02)				80 81		Silty Clay	(79.5 - 81.0) Silty Clay (CL), brn-yellow (10YR 6/6), very stiff, dry, Mn-O specks, trace vf sand, LEK
		DA to 84.5'								82			8/30/2011, stop drilling @ 81'
										83			8/31/2011, start drilling from 81' to 106'
										84			
		SP 84.5' to 86'	14 22 29	18 18		85F (8:45) - DUP - 85F (8:54)				85 86			@ 84.5 ft, light yellow brown (10YR 6/4)
		SP 86' to 87.5'	13 20 26	18 18						87		Sandy Silt	86.0' (86.0 - 87.5) Sandy Silt (ML) light yel-brn (10YR 6/4) med, damp, 20-30% vf-f sand, LEK.
		DA to 89.5'								88			
										89			
		SP	14	18						90			(89.5 - 91.0) Sandy Silt (ML), as above

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(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

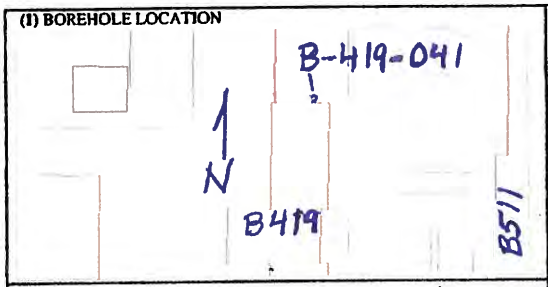
(3) Borehole/Well No.: B-419-040

Notes:

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		90' to 91'	18 26	18 ↓	-	90F (9:05)		Type II-V Portland Cement Grout		90 91		Sandy Silt	Sandy Silt (ML), cont'd
		DA to 94.5'								92 93 94			
		SP 94.5' to 96'	15 20 24	16 18 ↓	-	95F (9:15)				95 96	X		94.5' (94.5-96.0) Clayey Silt, (ML), light yel-brown (10YR 6/4), med, moist, crumbles, Mn-O specks, LEK
		DA to 99.5'								97 98 99		Clayey Silt	
		SP 99.5' to 101'	11 15 16	18 18 ↓	-	100F (9:25)				100 101	X		@99.5ft, same as at 94.5 ft. Driller indicates moisture/wet outside of sampler @ 90-100ft
		DA to 104.5'								102 103 104			
		SP 104.5' to 106'	12 19 23	18 18 ↓	-	105F (9:37)				105 106	X	Gravelly Sand	104.5' (104.5-106.0) Gravelly Sand, (SM/SW) yellow brown (10YR 5/6), med, moist, vf-vc grained 15-25% SA SR gravels to 3/4 inches, 10-15% clayey fines, L-MEK. 106'
										107 108 109 110			T.D. = 106.0ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation

(3) Borehole/Well No.: B-419-041

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McCanlie

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: Mobile Drill B-61

(9) Drilling Contractor: Gregg Drilling / Martinez, CA

(10) Driller/Helper: Eric Santellan / Rick Ryon

(11) Drilling Method: Hollow-Stem auger

(12) Sample Method: SP split-spoon; 4.5'-100.5

(13) Hammer Weight/Drop: 140 lb / 30-inch

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 6-inch Final: 6-inch

(16) Borehole Started, Time/Date: 0:25 / 9/6/2011

(17) Borehole Completed, Time/Date: 10:00 / 9/7/2011

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	92.00'	90.00'	89.98'	—
Boring/Casing Depth	100.5'	100.5'	100.5'	—
Time	9:57	10:01	11:00	—
Date	9/7/11	9/7/11	9/7/11	—

(21) Well Head Completion: N/A

Notes: Soil core had readings of 0 mg/cm³ Hg with sniffer and α, β, and gamma at bkgd levels.

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(23) Total Depth: 100.5 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
		Concrete Coring		0.5/0.5		COMP-001						Concrete	6" thick slurry cement layer above concrete (0-0.5) Concrete slab.
		DA to 4.0'						Type II-V Portland Cement Grout		1 2 3 4			
		SP 4'-5.5'	7 10	18/18						5		Silt / Gravelly	(4-5.5) Gravelly Silt (ML) yellow brown (10YR 5/4), firm, damp, 20-25% SA-SR gravels to 1.5 inches, low plasticity fines, LEK
		↓ DA to 9.0'	11	↓		SP (8:45)				6			
										7 8 9			
		SP to 10.5'	19 27	18/18						10		Gravelly Sand	(9'-10.5) Gravelly Sand, (SM/SW) yellow brown (10YR 5/4) dense, damp

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation

(3) Borehole/Well No.: B-419-041

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
		↓	30	↓		-10F (9:54)		Type II-V Portland Cement Grout		10		Gravelly Sand	vf-vc grained, 25-35% gravels to 3/4-inch, 10% fines, LEK-M.
		DA to 14.0'								11			
										12			
										13			
										14			
		SP 14'-15.5'	13 / 22	18 / 18						15	X		(14-15.5), same as at 9-10.5 ft.
		↓	26	↓		-15F (9:05)							
		DA to 19'								16			
										17			
										18			
										19			19'
		SP 19'-20.5'	14 / 19	18 / 18						20	X	Clayey Silt	(19-2.5) Clayey Silt (ML), light yellow brown (10YR 6/4), firm, damp, low plasticity LEK.
		↓	20	↓		-20F (9:10)							
		SP 20.5'-22	15 / 21	18 / 18		-DUP- 20F (9:13)				21			
		↓	27	↓						22	X		
		DA to 24'								23			
										24			24'
		SP 24'-25.5'	13 / 17	18 / 18						25	X	Silty Sand	(24-25.5) Silty Sand (SM) light yellow brown (10YR 6/4), loose, dry, vf-f grained, 10-15% silty fines, L-MEK.
		↓	19	↓		-25F (9:27)							
		DA to 29								26			
										27			
										28			
										29			29'
		SP 29'-30.5'	13 / 18	18 / 18						30	X	Clayey Silt	(29.-30.5) Clayey Silt (ML) yellow brown (10YR 5/6) firm, dry, low plasticity, tight.

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(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-041

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annular/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
		↓	20	↓		-30F (9:35)		Type II-V Portland Cement Grout		30		Clayey Silt.	trace SR gravels to 1/2 inch, LEK.
		DA to 34'								31			
										32			
										33			
										34			
		SP 34'-35.5'	11 / 15	18 / 18						35			(34-35.5) Clayey Silt (ML) light yellow-brn (2.5Y 6/4) firm, dry, low plasticity, caliche (cream-gray) deposits, LEK, crumbles.
		↓	17	↓		-35F (9:50)							
		DA to 39'								36			
										37			
										38			
										39			39'
		SP 39'-40.5'	18 / 22	18 / 18						40		Sandy Silt	(39-40.5) Sandy Silt, (ML) light olive-brown (2.5Y 5/6), firm, damp 15-25% vf sand crumbles, some plasticity, LEK.
		↓	27	↓		-40F (9:58)							
		DA to 44'								41			
										42			
										43			
										44			44'
		SP 44'-45.5'	19 / 27	18 / 18						45		Gravelly Sand	(44-45.5) Gravelly Sand, (SW/SW) yel-brn (10YR 5/6), dense, damp, vf-vc grained, 20-30% SA-SR gravels to 1.5 inches, 10% fines, 2-MEK.
		↓	33	↓		-45F 10:10							
		DA to 49'								46			
										47			
										48			
										49			(49.-50.5) Same as at 44-45.5ft, gravel up to 2 inches.
		SP 49-50.5	19 / 21	18 / 18						50			

------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; Ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub. SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-041

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes.
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
			32			-50F				50			Gravelly Sand (SM/SW), cont'd
		DA to 54'								51			
										52			
										53			
										54			
		SP 54'-55.5'	17 23	18 / 18						55			@54ft, same as above with 35-40% SA-SR gravels to 1.5 inch.
			27			-55F							
		DA to 59'								56			
										57			
										58			
										59			
		SP 59'-60.5'	15 21	18 / 18						60			@59ft, Gravelly Sand, as above, 15-25% SA-SR gravels to 3/4-inch.
			31			-60F							
		DA to 64'								61			
										62			
										63			
										64			
		SP 64'-65.5'	15 22	18 / 18						65			@64ft. Gravelly Sand as above
			23			-65F							9/6/2011 Stop @ 70'
		DA to 69'	22							66			
										67			
										68			
										69			
		SP 69'-70.5'	11 13	18 / 18						70			(69-70.1) same as above with 10-20% SA-SR gravels to 1.5 inch.

Type II - V Portland Cement Grout

Gravelly Sand

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; Ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-041

Notes: 70.1

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-041
		↓	19	↓		-70F (9:07)				70			(70.1 – 70.5) Clayey Silt, (ML) yellow brown (10YR 6/5), stiff, dry, tight, trace m sand, Mn-O specks, LEK.	
		SP 70.5'-72'	15 / 18	18 / 18						71				
		↓	19	↓						72				
		DA to 74'								73				
		↓								74				
		SP 74'-75.5'	16 / 18	18 / 18						75			(74 – 75.5) Clayey Silt (ML), brown-yellow (10YR 6/6), firm, dry, crumbles, Mn-O specks low plasticity, LEK.	
		↓	20	↓		-75F (9:18)								
		DA to 79'						Type II Portland Cement Grout		76				
										77				
										78				
										79				
		SP 79'-80.5'	11 / 13	18 / 18								Clayey Silt	(79 – 80.5) Clayey Silt (ML) as above.	
		↓	18	↓		-80F (9:30)				80				
		SP 80.5'-82'	13 / 16	18 / 18		-DUP- 80F (9:35)				81				
		↓	20	↓						82				
		DA to 84'								83				
										84				
		SP 84'-85.5'	13 / 15	18 / 18						85			(84 – 85.5) Clayey Silt (ML) light yellow brown (2.5Y 6/4), firm, damp, low plasticity LEK.	
		↓	17	↓		-85F (9:43)								
		DA to 89'								86				
										87				
										88				
										89				
		SP 89'-90.5	9 / 12	18 / 18						90			(89 – 90.5) Clayey Silt (ML) light yel-brn (2.5Y 6/4), firm, damp, tight, trace SA gravels	

------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark, E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; Ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide, mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub, SA = subangular; soft sed = soft sediment deformation, SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation

(3) Borehole/Well No.: B-419-041

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
			16			-90F (9:55)		Type II-V Portland Cement Grout		90		Clayey Silt	to 1/2 inch, LEK.
		DA to 94'								91			
										92			
										93			
										94			94'
		SP 94'-95.5'	11 13	18/18						95			(94-95.5) Silt (ML) light brown-yellow (2.5Y 6/4), firm, moist, low plasticity, LEK
			19			-95F (10:11)							
		DA to 99'								96		Silt	
										97			
										98			
										99			99'
		SP 99'-100.5'	9 17	18/18						100		Clayey Silt	(99-100.5) Clayey Silt (ML), light olive brown (2.5Y 5/4), firm, moist, tight, low plasticity, Mn-O specks, LEKs
			20			-100F (10:24)							
										101			T.D. = 100.5ft
										102			9/7/11 @ 10:00 AM
										103			
										104			
										105			
										106			
										107			
										108			
										109			
										110			

Tank Vault sidewall sample location

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N

B419

B511

B-419-042A

(2) Project: LLNL B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-042A

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McCaribe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: N/A

(9) Drilling Contractor: D&D crew

(10) Driller/Helper: N/A

(11) Drilling Method: Concrete Coring

(12) Sample Method: Concrete coring

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3-inches Final: 3-inches

(16) Borehole Started, Time/Date: 11:13 / 8/15/2011

(17) Borehole Completed, Time/Date: 11:35 8/15/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 2.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A

By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
		Concrete Coring		0.75 / 0.75		B-419-COMP-005		Insulation Foam				Concrete
		Concrete Core		1.25 / 1.25		IF (11:35				1		Gravelly Sand
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels

(0.0 - 0.75) Concrete sidewall

0.75

(0.75 - 2.0) Gravelly Sand (SW) yellow brown (10YR5/4), med., damp, vf - vc grained, 10-15% SA - SR gravels to 1-inch, trace fines, MEK.

2.0'

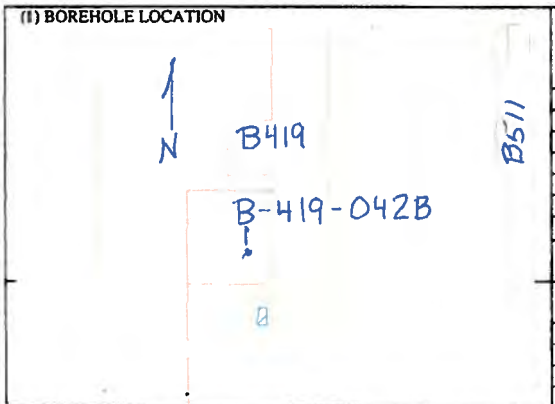
T.D. = 2.0 ft

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Tank Vault sidewall sample location

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-042B
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McCombe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: N/A
(9) Drilling Contractor: D+D crew	
(10) Driller/Helper: N/A	
(11) Drilling Method: Concrete coring	(12) Sample Method: Concrete coring
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 3-inches	Final: 3 inches
(16) Borehole Started, Time/Date: 13:55 / 8/15/2011	(17) Borehole Completed, Time/Date: 14:00 / 8/15/11
(18) Water Source: B419 area hydrant	
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 2.0 ft | (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A | #0/30: N/A
(27) Well Development Method: N/A
Time: — Date: — Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —
(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings at 0mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
		Concrete coring		0.75 / 0.75		B-419-COMP-005		Insulation foam				Concrete	(0.0-0.75) Concrete sidewal — 0.7
		Concrete Core		1.0 / 1.25		-1F (1400)				1		Gravelly Sand	(0.75-2.0) Gravelly Sand (SW/SP), yellow-brn (10YR 5/4), med, damp, vf-vc grained 10-15% gravels to 1-inch, 5-10% fines, L-MEK — 2.0'
										2	NR		
										3			T.D. = 2.0 ft
										4			
										5			
										6			
										7			
										8			
										9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Tank Vault sidewall sample location

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N

B419

B511

B-419-043

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-043

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McLaughlin

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Merrow

(8) Drill Rig: N/A

(9) Drilling Contractor: D+D crew

(10) Driller/Helper: N/A

(11) Drilling Method: Concrete Coring

(12) Sample Method: Concrete coring

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3-inches Final: 3-inches

(16) Borehole Started, Time/Date: 13:45 / 8/15/2011

(17) Borehole Completed, Time/Date: 13:50 / 8/15/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 2.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg shiffer and α, β, and gamma at bkgd levels.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Coring		0.8/0.8		B-419-COMP-005		Insulation Foam		1		Concrete	(0.0-0.8') Concrete sidewall — 0.8'
		Concrete Coring		1.2/1.2		-1F (13:50)				2		Gravelly Sand	(0.8-2.0') Gravelly Sand (SW/SM), Yellow-brown (10YR5/4), med, damp, vf-vc grained, 15-20% SA-SR gravels to 1-inch 5-10% fines, L-MEK. — 2.0'
										3			
										4			T.D. = 2.0 ft
										5			
										6			
										7			
										8			
										9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Tank Vault sidewall sample location

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N

B419

B511

B-419-044

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-044

(4) Job No.: 33924-B419.3.3

(5) Logged By: Will McIntire

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Merrow

(8) Drill Rig: N/A

(9) Drilling Contractor: P & D crew

(10) Driller/Helper: N/A

(11) Drilling Method: Concrete coring

(12) Sample Method: Concrete coring

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3-inches Final: 3-inches

(16) Borehole Started, Time/Date: 13:35 / 8/15/2011

(17) Borehole Completed, Time/Date: 13:40 / 8/15/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 2.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
		Concrete Coring		0.75 / 0.75		B-419-COMP-005		Insulation Foam				Concrete
		Concrete Core		1.15 / 1.25		-1F (13:46)				1		Gravelly Sand
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/m³ with Hg sniffer and α, β, and gamma at bkgd levels

(0.0-0.75) Concrete sidewall 0.7

(0.75-2.0) Gravelly Sand (SW/SM) Yellow brown (10YR 5/4), med dense, vf-vc grained, 10-15% SA gravels to 1-inch, 5-10% fines, L-MEK. 2.0'

T.D. = 2.0 ft

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Tank Vault sidewall sample location

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

N

B419

B511

B-419-045

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-045

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConihe

(6) Edited By: Mark Burscheck

(7) Project Manager: Valerie Marrow

(8) Drill Rig: N/A

(9) Drilling Contractor: D&D crew

(10) Driller/Helper: N/A

(11) Drilling Method: Concrete coring

(12) Sample Method: Concrete coring

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3-inches Final: 3-inches

(16) Borehole Started, Time/Date: 13:20 / 8/15/2011

(17) Borehole Completed, Time/Date: 13:30 / 8/15/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 2.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3 N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

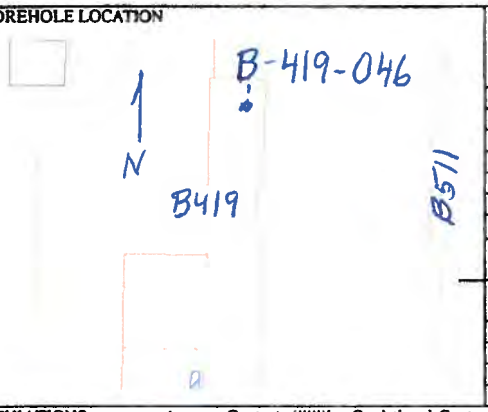
Soil core had readings of 0mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels.

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock												
		Concrete Coring		0.75 / 0.75		B-419-COMP-005		Insulation Foam				Concrete	(0.0-0.75) Concrete sidewal
										1			0.75
		Concrete Core		1.0 / 1.25		-1F (13:30)						Gravelly Sand	(0.75-2.0) Gravelly Sand (SW/SM) Yellow brown, (10YR5/4), med, damp, vf-vc grained, 10-15% SA-SR gravels to 1-inch, 5-10% fines, tight, L-MEK
										2	NR		2.0'
										3			
										4			T.D. = 2.0 ft
										5			
										6			
										7			
										8			
										9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-046
	(4) Job No.: 33824-B419.33
(5) Logged By: William McLoughlin	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL MZ.5 DP
(9) Drilling Contractor: Gregg Drilling / Martinez, CA	
(10) Driller/Helper: Vince Pokrywka / Armando Torres	
(11) Drilling Method: Direct-Push	(12) Sample Method: Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 11:10 / 8/24/2011	(17) Borehole Completed, Time/Date: 11:31 / 8/24/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date —	

Work Area	Soil/Rock	(30) OVA/PID Field Readings (ppm)	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
			Concrete Coring		0.6/0.6				Cement Grout				Concrete	Soil core had readings of 0 mg/cm3 Hg with sniffer and α, β, and gamma at bkgd levels
														(0.-0.6) Concrete slab, origin D.
											1		Sand	(0.6-1.6) Sand (S), , ow (2.5Y 7/6), ose med, m is, vf-m grained, MEK. 1.6
			DP to 3.0'		1.9/3.0	Hand dirge 37.6	1F (11:16)				2			
											3	NR	Gravelly Sand	(1.6-16.0) Gravelly Sand (SW SM), dk yellow brown (10YR 4/4); med to dense, damp, vf-vc grained, 10-20% SA-SR gravels to 1.5-inche, 5% fines, tight, LEK-M.
			DP to 8.0'		3.7/4.0						4			
							5F (11:28)				5			
											6			
											7			
											8	NR		
			DP to 12.0'		4.0/4.0						9			
											10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact, ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded, RC = rock core, RQD = rock quality description, rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with, x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
					-10F (11:42)			Type II+V Portland Cement Grout		0		Gravelly Sand
										1		
										2		
		DP to 16.0'		3.7/4.0						3		
										4		
										5		
					-15F (11:56)					6	NR	
										7		
										8		
										9		
										0		
										1		
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										0		

(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation

(3) Borehole/Well No.: B-419-046

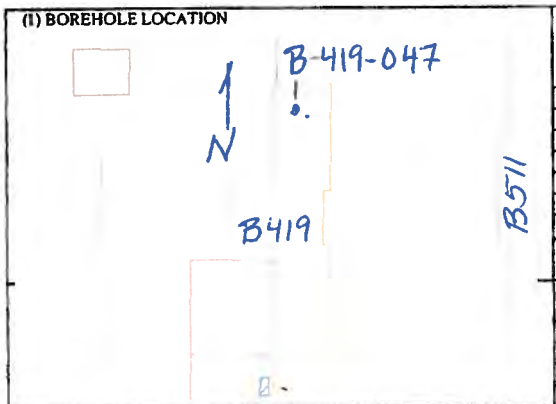
Notes:

Gravelly Sand (SW/SM), cont'd.

T.D. = 16.0 ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation	(3) Borehole/Well No.: B-419-047
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McLoughlin	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M2SOP
(9) Drilling Contractor: Gregg Drilling / Martinez, CA	
(10) Driller/Helper: Vince Pokrywka / Armando Torres	
(11) Drilling Method: Direct-Push	(12) Sample Method: Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 9:10 / 8/23/11	(17) Borehole Completed, Time/Date: 7:25 / 8/23/11 — (18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date: —	

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Soil Core had readings of 0 mg/cm³ Hg with sniffer and α, β, and gamma at bkgd levels.
		Concrete Coring		0.6/06				Type II-V Portland Cement Grout				Concrete	(0-0.6) Concrete slab -0.6'
		DP to 4.0'		1.4/3.4		-1F (9:14)				1		Sand	(0.6-1.6) Sand (SP) yellow (10YR 8/6), med, damp, vf-m grained, MEK, -1.6'
										2	NR	Gravelly Sand	(1.6-16.0) Gravelly Sand (SW) light olive brown (2.5Y 5/3), med. damp, vf-vc grained, 10-20% SA-SR gravels to 1.5 inches, trace silt, L-MEK;
										3			@ 4-6.1 ft is wet;
										4			upper 8 ft is soft from dri on
		DP to 8.0'		2.1/4.0		-5F (9:26)				5			
										6	NR		
										7			
										8			
		DP to 12.0'		3.0/4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity, 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead, def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide, grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate, NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded, RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-047

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 Inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
						-10F (9:41)		Type II-V Portland Cement Grout		1		Gravelly Sand	Gravelly Sand (SW), cont'd.
											NR		
		DP to 16.0'		3.8/4.0						2			
										3			
										4			
										5			
						-15F (9:54)				6			
										7			T.D. = 16.0 ft
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION

B-419-048

N

B419

B511

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-048
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M2.5DP
(9) Drilling Contractor: Gregg Drilling / Martinez, CA	
(10) Driller/Helper: Vince Pokrywka / Armando Torres	
(11) Drilling Method: Direct-Push	(12) Sample Method: Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 8:08 / 8/23/11	(17) Borehole Completed, Time/Date: 8:40 / 8/23/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date —	

Work Area	Soil/Rock	(30) OVA/PID Field Readings (ppm)	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact
			Concrete Coring		0.5/0.5				Type II Portland Cement Grout				Concrete
			DP to 4.0'		3.2/3.5		-1F (8:15)				1		Sand
											2		Gravelly Sand
											3		
											4	NR	Clayey Silt
			DP to 8.0'		2.9/4.0						5		Gravelly Sand
							-5F (8:26)				6		
											7	NR	
											8		
			DP to 12.0'		3.6/4.0						9		
											10		

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels.

(0. 0.5) Concrete slab. ⌐0.5'

(0.5 - 1.6) Sand, (SP), yellow (10YR 6/6) med damp, vf-m, sorted, MEK. ⌐1.6'

(1.6 - 2.8) Gravelly Sand (SW) light olive brown, (2.5Y 5/3), med, damp vf-vc gravel, 10-20% SA-SR gravel to 1/2-inch, trace silt, L-MEK. ⌐2.8'

(2.8 - 4.4) Clayey Silt (ML) yellow brn (10YR 5/4), med, damp, 10-20% vf-c sand, 1 1/2-inch SA gravels at 3.5 ft, LEK ⌐4.4'

(4.4 - 16.0) Gravelly Sand (SW SM), yellow brown (10YR 6/6), med, damp vf-vc gravel, 10-20% SA-SR gravel to 1.25-inch, 5% fines, tight, LEK-M, some Fe-O staining

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
					-10F (8:44)			Cement Grout		10		
										11		
										12	NR	Gravelly Sand
		DP to 16.0'		4.0/4.0				Type II-V Portland		13		
										14		
										15		
					-15F (8:54)					16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation

(3) Borehole/Well No.: B-419-048

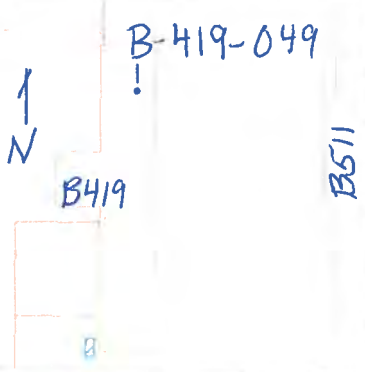
Notes:

Gravelly Sand, (SW/SM), cont'd

T.D. = 16.0 ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-049
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConiha	(6) Edited By: Mark Buechele
(7) Project Manager: Valerie Marrow	(8) Drill Rig: MARL M25 DP
(9) Drilling Contractor: Gregg Drilling / Martinez, CA	
(10) Driller/Helper: Vince Pakrywka / Armando Torres	
(11) Drilling Method: Direct-Push	(12) Sample Method: Direct-Push
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 10:56 / 8/22/2011	(17) Borehole Completed, Time/Date: 1120 / 8/22/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A
(21) Well Head Completion N/A	

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

ABBREVIATIONS: ------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push.

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —	(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ Hg with sniffer and α, β, and gamma at bkgd levels

(30) OVA/PID Field Readings (ppm)	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) Lithologic Description
	Concrete Coring		0.5/0.5				Type II-V Portland Cement Grout				Concrete	(0-0.5) Concrete slab ~0.5'
	DP to 4.0'		2.9/3.5		1F (11:00)				1		Sand	(0.5-1.5) Sand, (SP), yellow (10YR 7/6) med-loose, dry, vf-m grained, MEK. ~1.5'
									2		Clayey Silt	(1.5-4.0) Clayey Silt (ML), gray (10YR 3/2) med, damp, 10% SA gravels to 0.3 inch, LEK.
									3			
									4	NR		4.0'
	DP to 8.0'		2.3/4.0		2F (11:15)				5		Gravelly Sand	(4.0-15.4) Gravelly Sand (SM/SW) dk gray brown (10YR 3/2), dense, damp, vf-vc grained, 10-20% SA gravels to 1.5 inches, 10-15% fines, tight, LEK.
									6			
									7	NR		
									8			
	DP to 12.0'		3.0/4.0						9			
									10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

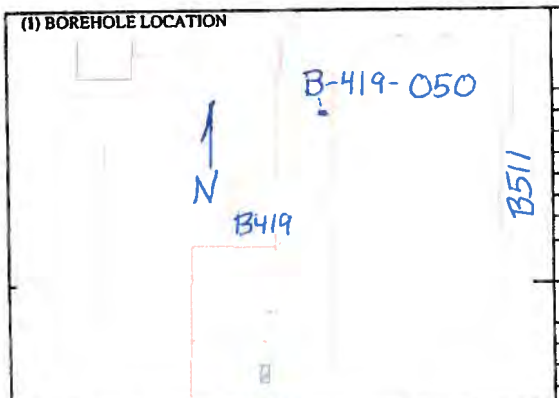
(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-049

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
						-10F (11:25)		Type II V Portland Cement Grout		10			Gravelly Sand, (SM/SW), cont'd
										11	NR		
		DP to 16.0'		4.0/4.0						12			
										13			
										14			
						-15F (11:40)				15			15.4 (15.4 - 16.0) Clayey Silt (ML) yellow brn, (10YR 5/4), mcd, damp, 10 % vf-vc sand, tight, LEK.
										16			T.D = 16.0 ft
										17			
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-050

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McCombe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M25DP

(9) Drilling Contractor: Gregg Drilling / Martinez, CA

(10) Driller/Helper: Vince Pokrywka / Armando Torress

(11) Drilling Method: Hand auger and Direct-Push

(12) Sample Method: Hand auger: 1'-2.5'; Direct-Push: 2.5'-16

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 1'-2.5' Final: 2 1/4-inch: 2.5'-16'

(16) Borehole Started, Time/Date: 9:20 / 8/22/2011

(17) Borehole Completed, Time/Date: 10:00 / 8/22/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact
Work Area	Soil/Rock											
		Concrete Coring		0.5/0.5				Type II-V Portland Cement Grout				Concrete
		HA to 2.5'		2.0/2.0		1F (9:25)				1		Gravel
						2F-DUP-2F (9:30)				2		Clayey Silt
		DP to 4.0'		1.5/1.5						3		
										4		
		DP to 8.0'		3.5/4.0		5F (9:55)				5		Clayey Sand
										6		
										7		Gravelly Sand
										8	NR	
		DP to 12.0'		2.0/4.0						9		
										10		

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ Hg with sniffer and α, β, and gamma at bkgd level

(0.0-0.5) Concrete slab ~0.5

(0.5-1.0) Baserock, gray ( ) SA gravels to 0.25 inch. ~1.0'

(1.0-4.0) Clayey Silt (M), gray brown (10YR 4/2), med, wet, 10% SA gravels to 0.25-inch, LFK. ~4.0'

(4.0-6.0) Clayey Sand ( ), yellow bra (10YR 4/4), med, damp, vf-vc grained clayey fines, 10% SA gravels to 0.25 inch, LMFK. ~6.0

(6.0-16) Gra ly Sand (SW), brown, (1 YR 5/3), med, damp, vf-vc grained, 20-25% SA-SR gravels to .5 inch, LFK; very tight and hard at depths.

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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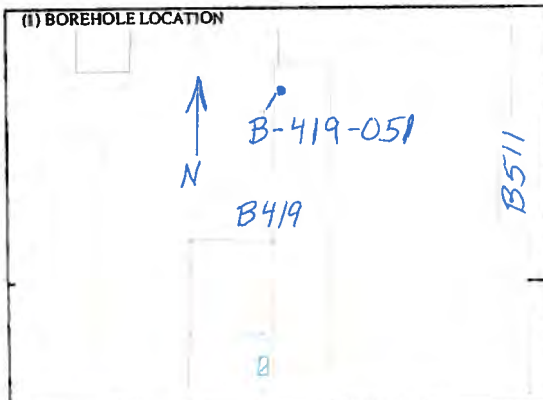
(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-050

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
						10F (10:10)		Type II-V Portland Cement Grout		10		Gravelly Sand	Gravelly Sand, (SW), cont'd.
										11	NR		
										12			
		DP to 16.0'		2.9/4.0						13			
										14			
						14.5F (10:22)				15			
											NR		
										16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-051
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL MZ-5DP
(9) Drilling Contractor: Gregg Drilling / Martinez, CA	
(10) Driller/Helper: Vince Pokrywka / Armando Torres	
(11) Drilling Method: Hand-auger & Direct-Push	(12) Sample Method: Hand-auger: 1-2' & Direct-Push: 12'-16'
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 2 1/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 10:49 / 8/23/2011	(17) Borehole Completed, Time/Date: 11:45 / 8/23/11
	(18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3 N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A	(29) Circulation: N/A
By: — Date —	

(42) LITHOLOGIC DESCRIPTIONS

Soil core had readings of 0 mg/cm³ Hg with sniffer and α, β, and gamma at bkgd levels.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		Concrete Coring		0.6/0.6				Type II-V Portland Cement Grout				Concrete	(0-0.6) Concrete slab 0.6'
		DP to 4.0'		1.1/3.0	HA: 1-2' for more sample recovery	TF 10:52				1		Sand	(0.6-1.2) Sand, (SP) yellow (10YR 8/6) med, damp, vf-m grained, MEK 1.2'
										2		Gravelly Sand	(1.2-4.6) Gravelly Sand (SW) light olive brown (2.5Y 5/3), med, damp, vf-vc grained, 10-20% SA-SR gravels to 1-inch, trace silt, LMEK 4.6'
										3	NR		
										4			
		DP to 8.0		2.6/4.0		SF 11:05				5		Clayey Silt	(4.6-6) Clayey Silt (ML) yellow brown (10YR 5/4), med, damp, 10% vf-c sand, Mn-O specks, low plasticity, LEK 6.0
										6		Gravelly Sand	(6-16.0) Gravelly Sand, (SW) yel-brn (10YR 5/4), med, damp, vf-vc grained, 10-20% SA-SR gravels to 1½ inch, trace fines, LEK-M; 8-8.7ft very clayey, gray-brown color.
										7	NR		
										8			
		DP 12.0'		3.0/4.0						9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead, def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded, RC = rock core; RQD = rock quality description, rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation

(3) Borehole/Well No.: B-419-051

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 Inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (11:20)		Grout ↑		10			Gravelly Sand, (SW), cont'd
										11	NR		
										12		Gravelly Sand	
		DP TD 16.0'		4.0 / 4.0				Portland Cement					@ 12 – 14', very gravelly to 30-40%.
										13			
										14			
								Type II-V		15			
						-15F (11:32)				16			
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: SEE ATTACHED MAP DRILLED AT A 45 DEGREE ANGLE	(2) Project: LLNL 5200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-101
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. BUSCHECK
	(7) Project Manager: Valerie Morrow	(8) Drill Rig: Mari MST
	(9) Drilling Contractor: Greg Drilling Martinez CA	
	(10) Driller/Helper: Eric Sanchelan / Rich Ryan	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE - DIRECT PUSH
	(13) Hammer Weight/Drop:	(14) Bentonite Gel Used: none
	(15) Borehole Diameter, Pilot:	Final:
	(16) Borehole Started, Time/Date: 1240 / 9/19/10	(17) Borehole Completed, Time/Date: 1320 / 9/19/10 — (18) Water Source: N/A
Notes: DRILLED BY GEOPROBE SOIL BORING ONLY - NO WELL	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: N/A; Boring/Casing Depth; Time; Date	(21) Well Head Completion: N/A

ABBREVIATIONS: ——— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 32' — (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A — #0/30: N/A
(27) Well Development Method: Time: Date: Flow Rate: N/A
(28) Geophysical Logs, Type: By: Date N/A — (29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
													Hand Auger 0 to 5' bgs
		HA										AC/AB	3" AC on 9" AB
										1			
												ML	(1 - 5) Sandy Silt (ML) dark brown (7.5YR 3/3)
										2			m, stiff, moist, f. sand, SR-SA, 85% silt, 15%
													sand LEK
										3			
													ALL MEASUREMENTS SHOWN ARE
										4			ALONG THE 45-DEGREE ANGLE - NOT
													TRUE VERTICAL.
										5			
		DP 5		48/48							X	GP	(5 - 21) Sandy Gravel (GP) light olive brown
										6	X		(2.5Y 5/6), loose, moist, f to c sand and
											X		gravel, SR-SA, 60% gravel, 40% sand, HEK
										7	X		
						B419-101-7F					X		
										8	X		
											X		
										9	X		
		DP 9		48/48							X		
										10	X		

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

—— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; bra = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; gra = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K= Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-101

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
		DP 9 cont.		48/48 cont		B-419-101-10F						GP	SANDY GRAVEL (GP) AS ABOVE
										1			
										2			ALL MEASUREMENTS SHOWN ARE ALONG THE 45. DEGREE ANGLE - NOT TRUE VERTICAL DEPTH
										3			
		DP 13		48/48						4			
										5			
						B-419-101-15F				6			
										7			
		DP 17		48/48						8			
										9			
										20			
						B-419-101-20F				1			
		DP 21		48/48						2		ML	(21-32) Sandy Silt (ML) dark yellowish brown (10YR 4/6) m. stiff, moist, f. sand, SR, 75% Silt, 25% sand, LEK
										3			
										4			
										5			
		DP 25		48/48		B-419-101-25F				6			
										7			
										8			
										9			
		DP 29		12/12						30			

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(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(2) Project: LLNL S200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-101
		DP 30		24/24		B-419-101-30F						ML	Notes: BROWN SILT (ML) AS ABOVE.	
										31				
										2			T.D = 32' 9/19/10 1320 WAN	
										3			ALL MEASUREMENTS SHOWN ARE ALONG THE 45-DEGREE ANGLE NOT TRUE VERTICAL DEPTH.	
										4				
										5				
										6				
										7				
										8				
										9				
										40				
										1				
										2				
										3				
										4				
										5				
										6				
										7				
										8				
										9				
										50				

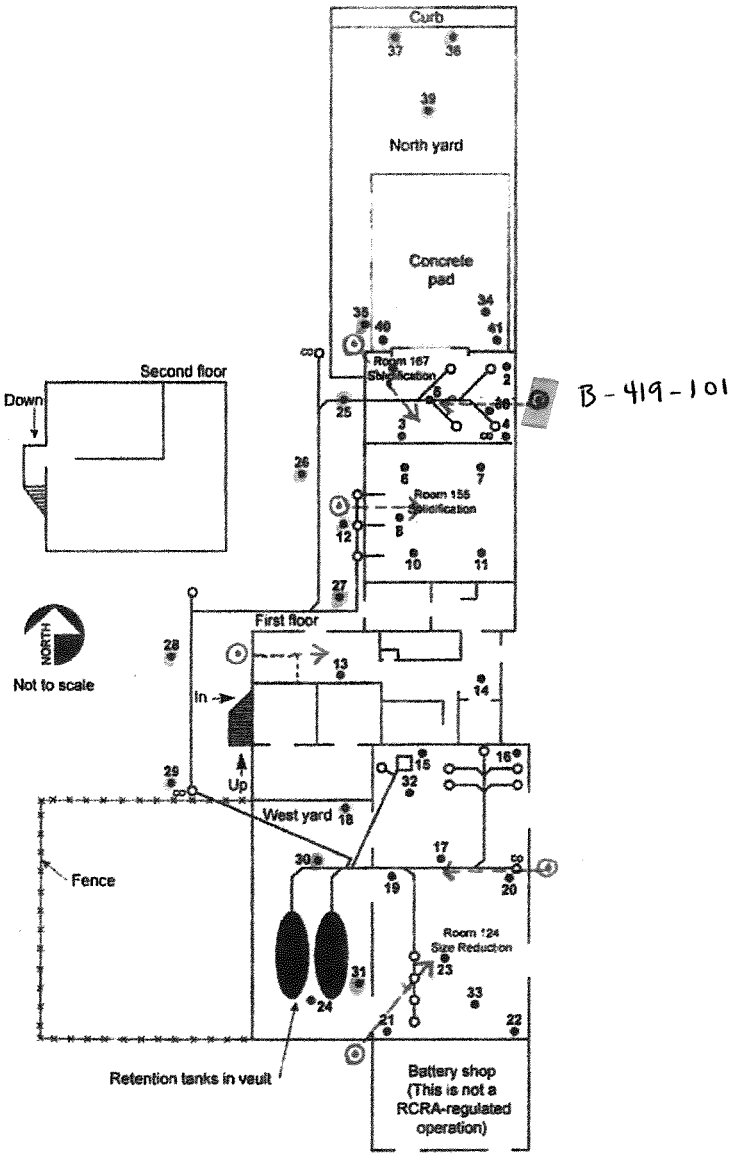

Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: SEE ATTACHED MAP DRILLED AT A 45 DEGREE ANGLE	(2) Project: LLNL 5200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-102
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. BUSCHECK
	(7) Project Manager: Valerie Morrow	(8) Drill Rig: Mari 5T
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Eric Sandtellan / Rick Ryan	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE DIRECT PUSH
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
	(15) Borehole Diameter, Pilot: 2 1/4"	Final: N/A
	(16) Borehole Started, Time/Date: 0800 / 9/19/10	(17) Borehole Completed, Time/Date: 0920 / 9/19/10
		(18) Water Source: N/A
Notes: DRILLED BY GEOPROBE. SOIL BORING ONLY - NO WELL	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: N/A	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ——— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 32' (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A #0/30: N/A
(27) Well Development Method: N/A
Time: Date: Flow Rate:
(28) Geophysical Logs, Type: N/A By: Date
(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Hand Auger 0 to 6' bgs. 45° ANGLE
		HA				B-419-102-OF	B-419-102-OF-DUP					AC/AB	1" AC on 11" AB
						B-419-102-1F	B-419-102-1F-DUP			1		ML	(1-11) Sandy Silt (ML) dark yellowish brown (10YR 4/4), m. stiff, moist, f. sand, SR-SA,
										2			70% silt, 30% sand, LEK
										3			
						B-419-102-3F	B-419-102-3F-DUP			4			ALL MEASUREMENTS SHOWN ARE ALONG THE 45 DEGREE ANGLE - NOT TRUE VERTICAL DEPTH.
										5			
										6			
		DP 6		48/48							X		@ 6-10 yellowish brown (10YR5/4), 80%
										7	X		Silt, 20% sand
						B-419-102-7F					X		
										8	X		
											X		
										9	X		
											X		
										10	X		

Note: Numbers **1–42** listed on this log correspond to Subsections **6.4.1–6.4.42** of SOP 1.1.

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(2) Project: LLNL 5200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-102

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 10		48/48		B-419-102-10F						ML	
										1		SP	(11 - 22) Gravelly Sand (SP) yellowish brown (10YR 5/6)
										2			loose, moist, f. sand, f gravel, SR-SA, 70% Sand 30%
													gravel, HEK
										3			
										4			ALL MEASUREMENTS SHOWN ARE
		DP 14		48/48									ALONG THE 45 DEGREE ANGLE -
										5			NOT TRUE VERTICAL DEPTH
						B-419-102-15F							
										6			
										7			
										8			
		DP 18		4/48							NR		
										9			
										20			No recovery prevented collection of B-419-102-20F
										1			
										2		ML	(22-32) Sandy Silt (ML) light olive brown (2.5Y 5/6)
		DP 22		48/48									m. stiff, moist, f. sand, SR-SA, 65% Silt, 35% sand
										3			LEK.
										4			
										5			
						B-419-102-25F							
										6			
		DP 26		48/48									
										7			
										8			
										9			
										30			

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(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact
		DP 30		24/24		B-419-102-30F					X	ML
										31	X	
											X	
										2	X	
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										40		
										1		
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										50		

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-102

Notes:

ALL MEASUREMENTS SHOWN ARE ALONG THE 45 DEGREE ANGLE - NOT TRUE VERTICAL DEPTH.

T.D = 32' 0920 9/19/10 WAN

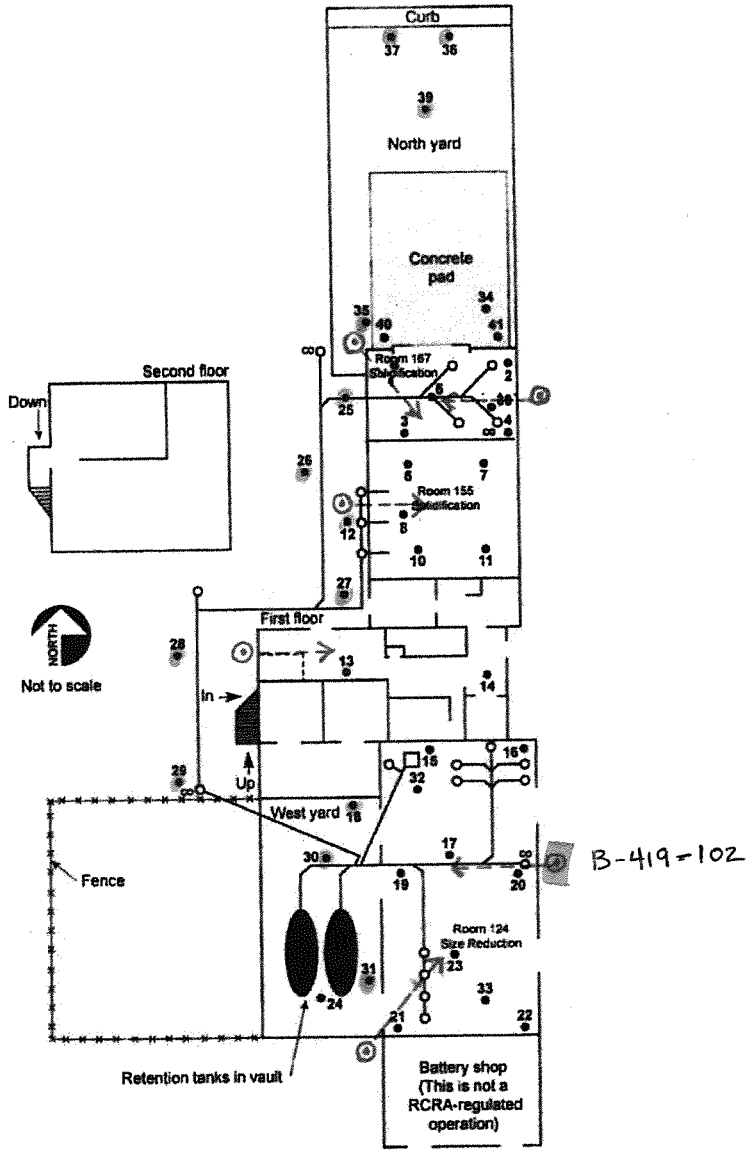

Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION SEE ATTACHED MAP SOIL BORING DRILLED AT A 45-DEGREE ANGLE	(2) Project: LLNL S200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-103
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: MARK BUSCHECK
	(7) Project Manager: Valerie Morrow	(8) Drill Rig: Mark MST
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Eric Sanbellan / Rick Ryon	
	(11) Drilling Method: Direct Push	(12) Sample Method: Continuous core
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: NA
	(15) Borehole Diameter, Pilot: N/A	Final: NA
	(16) Borehole Started, Time/Date: 0850 / 9/21/10	(17) Borehole Completed, Time/Date: 0920 / 9/21/10
		(18) Water Source: N/A
Notes: DRILLED BY GEOPROBE SOIL BORING ONLY - NO WELL	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: NO WATER	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 32'
(24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A #0/30: N/A
(27) Well Development Method: N/A
Time: Date: Flow Rate:
(28) Geophysical Logs, Type: N/A
By: Date
(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
													Hand Auger 0 to 5' bgs.
		HA										AC/AB	.15' AC on .55' AB
										1		ML	(.7-) Sandy Silt (ML) very dark gray (2.5Y3/1)
													soft, moist, f. sand, SR-SA, 75% silt,
										2			25% sand, LEK
													@ 2-2.5 dark brown (10YR3/3) w/ minor
										3			gravel
													@2.5-5 with coarse gravel. very
										4			hard to hand auger through.
										5			
		DP 5		48/48							X	GP	(5-25) Sandy Gravel (GP) light olive brown
										6	X		(2.5Y5/6) loose, moist, f to c sand and gravel
											X		SR-SA, 70% gravel 30% sand, HEK
										7	X		
											X		ALL MEASUREMENTS SHOWN ARE
										8	X		ALONG THE 45-DEGREE ANGLE -
											X		NOT TRUE VERTICAL DEPTH
										9	X		
		DP 9		36/48							X		
										10	X		

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(2) Project: LLNL 5200 B 419 RCRA Closure

(3) Borehole/Well No.: B-419-103

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes
		DP 9 Cont		36/48 Cont		B-419-103-10F					X	GP	SANDY GRAVEL (GP) AS ABOVE
										11	X		
											X		
										2	X		
											NR		
										3			ALL MEASUREMENTS SHOWN ARE ALONG THE 45-DEGREE ANGLE- NOT TRUE VERTICAL DEPTH
		DP 13		42/48							X		
										4	X		
											X		
										5	X		
						B-419-103-15F					X		
										6	X		
											NR		
		DP 17		42/48						7	X		
										8	X		
											X		
										9	X		
											X		
										20	X		
						B-419-103-20F					X		
										1	NR		
		DP 21		48/48							X		
										2	X		@ 22, black tar like substance on gravels.
											X		
										3	X		
											X		
										4	X		
											X		
										5	X	ML	(25-32) Sandy Silt (ML) brown (7.5YR 4/4), stiff, moist, f. sand, SR-SA, 85% silt, 15% sand, Heavy MnO. Streaking, LEK
		DP. 25		48/48		B-419-103-25F					X		
										6	X		
											X		
										7	X		
											X		
										8	X		
											X		
										9	X		@ 29 black tar like substance on gravels.
											X		
		DP 29		36/36									
										30	X		

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(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(2) Project:	(3) Borehole/Well No.:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	LLNL 5200 B419 RCRA closure	B-419-103

Notes:

Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample ID	Contact	Notes
DP 29 cont		36/36 cont	B-419-103-30F	ML	SANDY SILT (ML) As ABOVE
					TD=32 0920 9/21/10 WAN
					ALL MEASUREMENTS SHOWN ARE ALONG THE 45-DEGREE ANGLE - NOT TRUE VERTICAL DEPTH

Depth in Feet: 31, 2, 3, 4, 5, 6, 7, 8, 9, 40, 1, 2, 3, 4, 5, 6, 7, 8, 9, 50

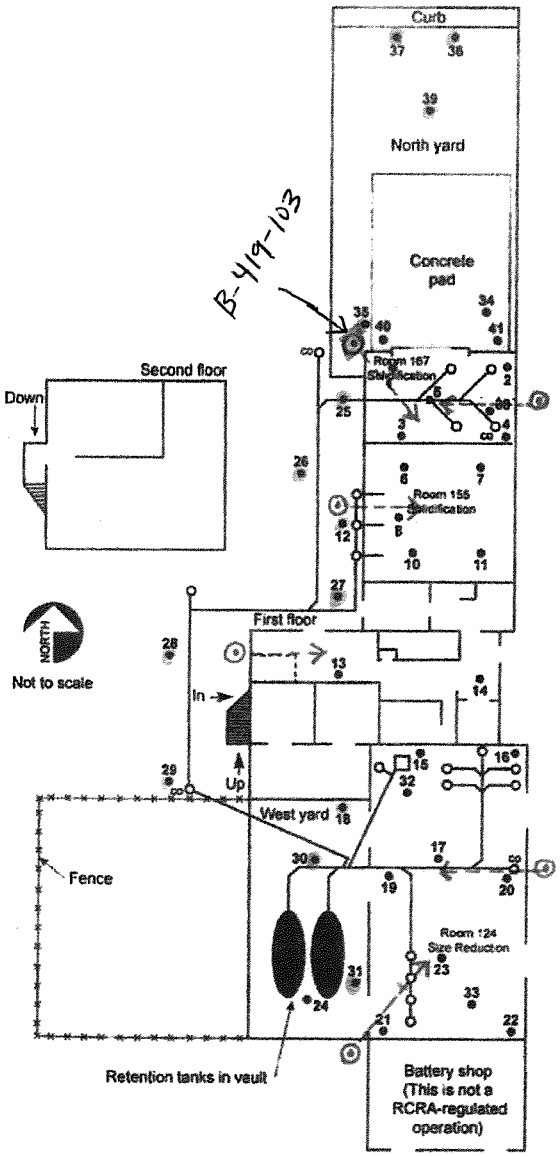

Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: See Attached Map. Soil Boring Drilled At A 45-Degree Angle	(2) Project: LLNL S200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-104
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. Buschek
	(7) Project Manager: Valerie Morrow	(8) Drill Rig: Mar MST
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Eric Sandellar / Rich Ryon	
	(11) Drilling Method: Direct Push	(12) Sample Method: GeoProbe
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 1200 / 9/21/10	(17) Borehole Completed, Time/Date: 1235 / 9/21/10
		(18) Water Source: N/A
Notes: Drilled By GeoProbe Soil Boring Only - Auger	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: No Water	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 32' (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A #0/30: N/A
(27) Well Development Method: N/A
Time: Date: Flow Rate:
(28) Geophysical Logs, Type: By: Date
(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm): Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
													Hand Auger 0 to 5' bgs
		HA										AC/AB	.15' AC on .55' AB
										1		ML	
													(.7 - 9) Sandy Silt (ML) dark yellowish
										2			brown (10YR 3/4) m. stiff moist, f. sand
													SR-SA, 80% silt, 20% sand, LEK
										3			
													All Measurements Shown
										4			Are Along The 45-Degree
													Angle - Not True Vertical
										5			Depth
		DP 5		48/48							X		
										6	X		
											X		
										7	X		
						B-419-104-7F	B-419-104-DUP-7F				X		
										8	X		
											X		
										9	X		(9 - 25) Sandy Gravel (GP) light olive
		DP 9		48/48							X	GP	brown (2.5Y 5/6) m. dense, moist, f to c sand
										10	X		and gravel, SR-SA, 65% gravel, 30% sand, HEK

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; y/w = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-104

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	Notes:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
		DP 9 cont		48/48 cont		B-419-104-10F					X	GP	Sandy Gravel (GP) As Above
										11	X		
											X		
										2	X		
											X		All Measurements Shown Are Along The 45-Degree Angle - Not True Vertical Depth.
		DP 13		48/48						3	X		
											X		
										4	X		
											X		
						B-419-104-15F				5	X		
											X		
										6	X		
											X		
		DP 17		48/48						7	X		
											X		
										8	X		
											X		
										9	X		
											X		
										20	X		
						B-419-104-20F					X		
										1	X		
		DP 21		48/48							X		
										2	X		
											X		
										3	X		
											X		
										4	X		
											X		
										5	X		
		DP. 25		48/48		B-419-104-25F					X	ML	(25-28) Sandy Silt (ML) Brown (10YR 4/3), m. stiff moist, f-sand, SR-SA, 85% Silt, 15% sand, Heavy MnO Streaking LEK
										6	X		
											X		
										7	X		
											X		
										8	X		
											X	GP	(28-32) Sandy Gravel (GP) light olive brown (2.5Y 5/6) loose, moist, f to c sand and gravel, SR-SA, 69% gravel 31% sand, HEK
										9	X		
		DP 29		36/36							X		
										30	X		

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(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(2) Project:	(3) Borehole/Well No.:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	LLNL S200 B419 RCRA Closure	B-419-104

Notes:

Depth in Feet	Sampler Type/Depth	Inches Recovered/Inches Driven	Sample ID	Recovery/Sample Loc.	Contact	Notes
	DP 29 cont.	36/36 cont.	B-419-104-30F	X	GP	BAILY GRAVEL (GP) AS ABOVE
1				X		
2				X		
						TD = 32' 1235 9/21/10 WAN
3						
4						ALL MEASUREMENTS SHOWN ARE ALONG THE 45-DEGREE ANGLE - NOT TRUE VERTICAL DEPTH.
5						
6						
7						
8						
9						
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
0						

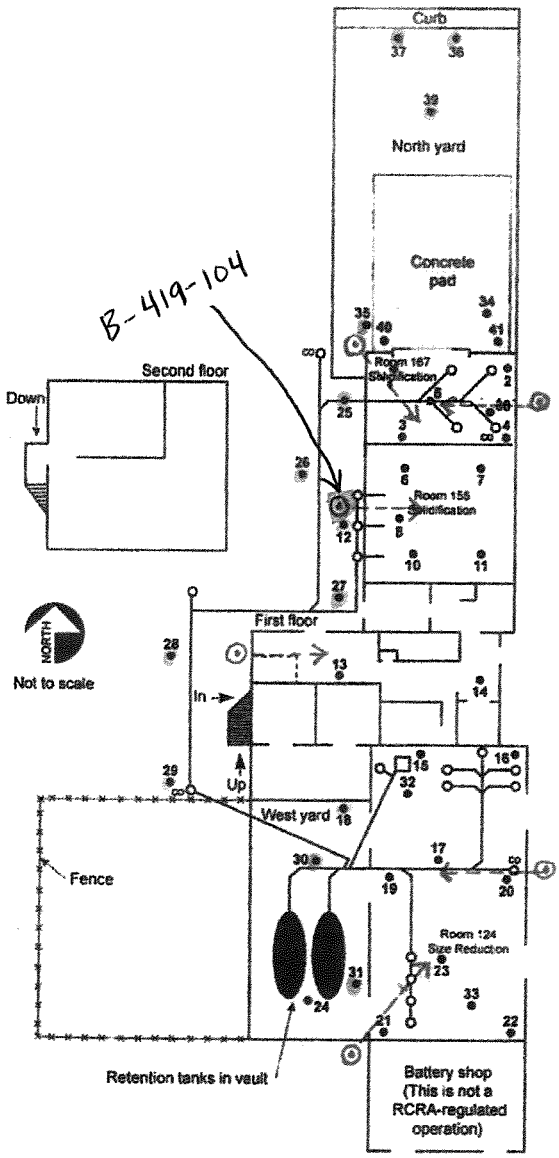


Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION: SEE ATTACHED MAP SOIL BORING DRILLED AT A 45-DEGREE ANGLE	(2) Project: LLNL 5200 B419 RCRA Closure	(3) Borehole/Well No.: B-419-105
		(4) Job No.: 33824 B419.3.3
	(5) Logged By: Andy Niemand	(6) Edited By: M. BUSCHECK
	(7) Project Manager: Valerie Morrow	(8) Drill Rig: Mari MST
	(9) Drilling Contractor: Gregg Drilling Martinez CA	
	(10) Driller/Helper: Eric Santellan / Rick Ryan	
	(11) Drilling Method: Direct Push	(12) Sample Method: GEOPROBE
	(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: none
	(15) Borehole Diameter, Pilot: N/A	Final: N/A
	(16) Borehole Started, Time/Date: 0920 / 9/22/10	(17) Borehole Completed, Time/Date: 1005 / 9/22/10 — (18) Water Source: N/A
Notes: DRILLED BY GEOPROBE SOIL BORING ONLY - NO WELL	(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A
	(22) Water Depth: NO WATER	(21) Well Head Completion: N/A
	Boring/Casing Depth	
	Time	
	Date	

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth: 32' — (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3: N/A — #0/30: N/A
(27) Well Development Method: N/A
Time: — Date: — Flow Rate:
(28) Geophysical Logs, Type: N/A — (29) Circulation: N/A
By: — Date

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
													Hand Auger 0-6' bgs
		HA											.15' AC on .7' AB
										1			
													(.85 - 6) Sandy Silt (ML) brown (7.5YR 4/4)
										2			M. stiff, moist, f. Sand SR-SA, 85% silt, 15%
													Sand, LEK
										3			
													ALL DEPTH MEASUREMENTS SHOWN ARE
										4			ALONG THE 45-DEGREE ANGLE-
													NOT TRUE VERTICAL DEPTH
										5			
										6			
		DP 6		48/48							X	Sm	(6-14) Silty Sand (SM) light olive brown (2.5Y 5/4)
										7	X		m. dense, moist, f Sand SR-SA, 80% sand,
						B-419-105-7F	+ QA/QC Sample				X		20% silt, LEK
										8	X		
											X		
										9	X		
											X		
										10	X		

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

——— = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact
		DP 10		42/48			B-419-105-10F			1	X	SM
										2	X	
										3	X	
										4	NR	
		DP 14		48/48						5	X	GP
							B-419-105-15F			6	X	
										7	X	
										8	X	
		DP 18		42/48						9	X	
										20	X	
							B-419-105-20F			1	X	
										2	NR	
		DP 22		48/48						3	X	
										4	X	
										5	X	
							B-419-105-25F			6	X	
		DP 26		48/48						7	X	
										8	X	
										9	X	ML
										0	X	

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-105

Notes:

SILTY SAND (SM) As Above

(14 – 29) Sandy Gravel (GP) grayish brown (2.5Y 5/2), loose, moist, f. to c. sand and gravel, SR-SA, 75% gravel, 25% sand HEK.

All Depth Measurements Shown Are Along The 45-Degree Angle - Not True Vertical Depth

(29-32) Sandy Silt (ML) dark yellowish brown (10YR 4/4) m. stiff, moist, f sand, SR-SA, 85% Silt, 15% sand LEK, MnO streaking.

——— = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; gra = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; y/w = yellow/yellowish.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(2) Project:	(3) Borehole/Well No.:
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	LLNL S200 B419 RCRA Closure	B-419-105
		DP 30		24/24		B-419-105-30F					X	ML	Notes: SANDY SILT (ML) AS ABOVE	
										1	X			
											X			
										2	X			
													T.D=32 1005 9/22/10 WAN	
										3				
													ALL DEPTH MEASUREMENTS SHOWN ARE ALONG THE 45-DEGREE ANGLE. NOT TRUE VERTICAL DEPTH	
										4				
										5				
										6				
										7				
										8				
										9				
										0				
										1				
										2				
										3				
										4				
										5				
										6				
										7				
										8				
										9				
										0				

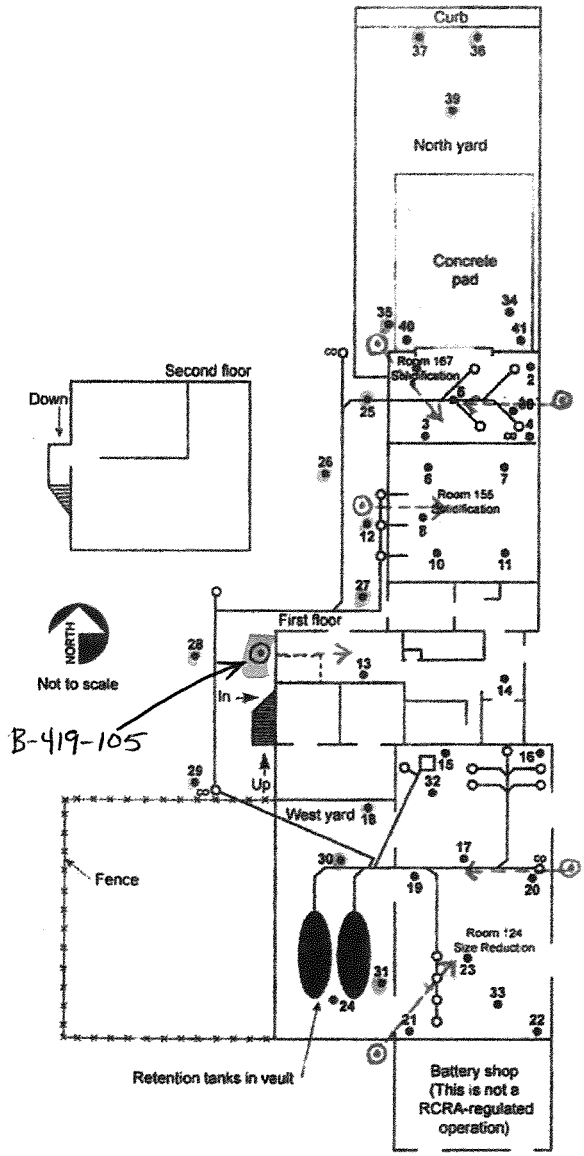


Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION	See Attached Map Soil Boring Drilled At A 45-Degree Angle
(2) Project:	LLNL S200 B419 RCRA Closure
(3) Borehole/Well No.:	B-419-106
(4) Job No.:	33824 B419.3.3
(5) Logged By:	Andy Nomand
(6) Edited By:	M. Gustucka
(7) Project Manager:	Valerie Morrow
(8) Drill Rig:	Mari MST
(9) Drilling Contractor:	Gregg Drilling, Martinez CA
(10) Driller/Helper:	Eric Sanbellan / Rick Ryan
(11) Drilling Method:	Direct push
(12) Sample Method:	GEOPROBE
(13) Hammer Weight/Drop:	N/A
(14) Bentonite Gel Used:	none
(15) Borehole Diameter, Pilot:	N/A
Final:	N/A
(16) Borehole Started, Time/Date:	1335 / 9/22/10
(17) Borehole Completed, Time/Date:	1410 / 9/22/10
(18) Water Source:	N/A
(19) Well Started, Time/Date:	N/A
(20) Well Completed, Time/Date:	N/A
(22) Water Depth	NO WATER
Boring/Casing Depth	
Time	
Date	
(21) Well Head Completion	N/A

Notes: Drilled By Geoprobe
Soil Boring Only - No Well

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx = iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(23) Total Depth:	32'
(24) Casing Depth:	N/A
(25) Screened Interval:	N/A
(26) Sand Pack, #3	N/A
#0/30:	N/A
(27) Well Development Method:	N/A
Time:	
Date:	
Flow Rate:	
(28) Geophysical Logs, Type:	
By:	
Date	N/A
(29) Circulation:	N/A

(30) OVA/PID Field Readings (ppm)	Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) (Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	(42) LITHOLOGIC DESCRIPTIONS
														Hand Auger 0 to 5' bgs
													AC/AB	.2' Ac on .8' AB
											1			
													ML	(1 - 5) Sandy Silt (ML) brown (7.5YR 3/3)
											2			m. stiff, moist, f. sand, SR-SA, 80% silt, 20%
														sand, LEK
											3			
														All Depth Measurements Shown
											4			Are Along The 45-Degree
														Angle - Not True Vertical Depth
											5			
			DP 5		48/48							X	GP	(5 - 13) Sandy Gravel (GP) light olive
											6	X		brown (2.5Y 5/6), m. dense, moist, f to c
												X		Sand and gravel, SR-SA, 75% gravel
											7	X		25% sand, LEK
							B-419-106-7F					X		
											8	X		
												X		
											9	X		
			DP 9		42/48							X		
											10	X		

Note: Numbers **1–42** listed on this log correspond to Subsections **6.4.1–6.4.42** of SOP 1.1.

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
		DP 9 Cont.		42/48		B-419-106-10F						GP
										1	X	
											X	
										2	X	
											X	
										3	NR	
		DP 13		42/48							X	SM
										4	X	
											X	
										5	X	
						B-419-106-15F					X	
										6	X	
											X	
										7	NR	
		DP 17		48/48							X	GP
										8	X	
											X	
										9	X	
											X	
										20	X	
						B-419-106-20F					X	
										1	X	
		DP 21		42/48							X	
										2	X	
											X	
										3	X	
											X	
										4	X	
											X	
										5	NR	
		DP 25		42/48		B-419-106-25F					X	
										6	X	
											X	
										7	X	
											X	
										8	X	
											X	
										9	NR	
		DP 29		36/36							X	
										30	X	

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-106

Notes:

SANDY GRAVEL (GP) AS ABOVE

(13 - 17) Silty Sand (SM) pale yellow (2.5Y 7/4) m. dense, moist, f. sand, SR-SA, 85% sand, 15% silt LEK

(17 - 32) Sandy Gravel (GP) light yellowish brown (2.5Y 6/4) dense, s. moist, f. to c. sand and gravel, SR-SA, 60% gravel, 40% sand, HEK

ALL DEPTH MEASUREMENTS SHOWN ARE ALONG THE 45-DEGREE ANGLE NOT TRUE VERTICAL DEPTH.

1410 9/22/00

——— = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL S200 B419 RCRA Closure

(3) Borehole/Well No.: B-419-106

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
		DP 29 Cont.		36/36 Cont.		B-419-106-30F					X	GP
										1	X	
											X	
										2	X	
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										0		
										1		
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										0		

Notes:

Brown Gravel (GP) 1/1

T.D = 32 1410 9/22/10 WAN

All Depth Measurements Shown Are Along The 45-Degree Angle - Not True Vertical Depth

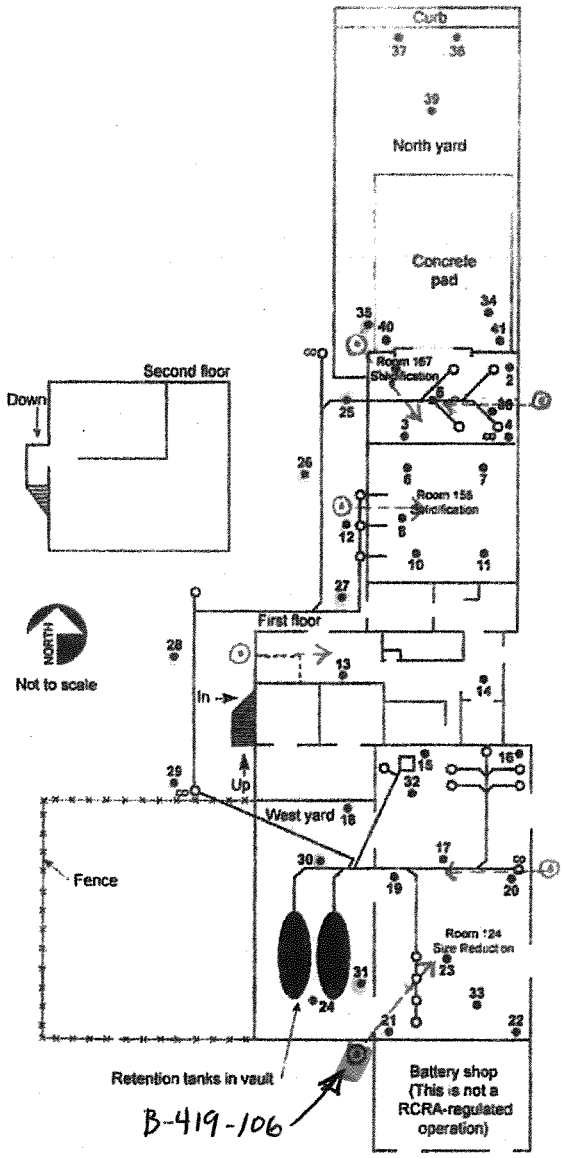


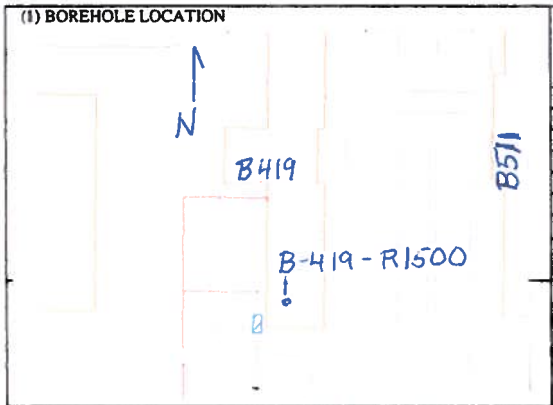
Figure 1. DTSC-specified sample borehole locations (green) and discretionary angled sample borehole locations (red) at the B-419 Facility.

Figure 1. B-419 Facility RCRA Closure borehole locations and discretionary angled borehole locations.

Concrete slab was cored and pulverized for sample collection. No soil boring occured at this location.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Subsurface Invest.	(3) Borehole/Well No.: B-419-R1500
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: N/A
(9) Drilling Contractor: D+D crew	
(10) Driller/Helper: N/A	
(11) Drilling Method: Concrete Coring	(12) Sample Method: Concrete pulverized
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 5-inch core	Final: 5-inch
(16) Borehole Started, Time/Date: 9:55 1/7/13/2011	(17) Borehole Completed, Time/Date: N/A; (18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: N/A	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion N/A

ABBREVIATIONS: ------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

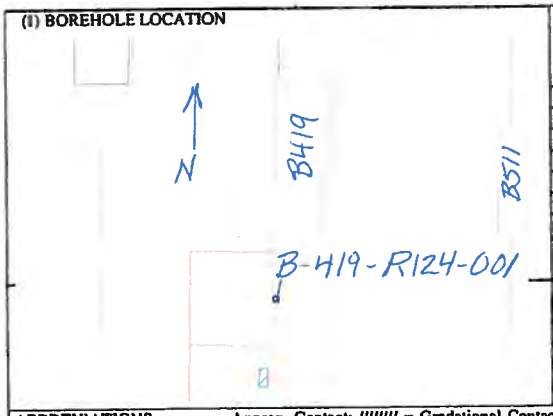
(23) Total Depth: 0.5 ft (24) Casing Depth: N/A
(25) Screened Interval: N/A
(26) Sand Pack, #3 N/A #0/30: N/A
(27) Well Development Method: N/A
Time: — Date: — Flow Rate: —
(28) Geophysical Logs, Type: N/A (29) Circulation: N/A
By: — Date —

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Concrete core had readings of 0 mg/cm3 with Hg sniffer and α, β, and gamma at background levels.
		Concrete Coring		0.5/0.5		B-419-R1500	-OF	Bent. Chips				concrete	(0.0 - 0.5) Concrete slab
										1			Total Depth = 0.5 feet
										2			Concrete core had readings of 0 mg/cm3 with Hg sniffer and α, β, and gamma at background levels.
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-R124-001
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McLoughlin	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Morrow	(8) Drill Rig: MARL M2.5DP
(9) Drilling Contractor: Gregg Drilling / Martinez, CA	
(10) Driller/Helper: Vince Pokrywka / Armando Torres	
(11) Drilling Method: Hand-auger + Direct-Push	(12) Sample Method: Hand-auger: 3'-4'; Direct-Push: 4'-16'
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 3 3/4-inch	Final: 2 1/4-inch
(16) Borehole Started, Time/Date: 10:50 / 9/19/2011	(17) Borehole Completed, Time/Date: 11:10 / 9/19/2011 — (18) Water Source: B419 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; ////////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —	(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Soil core runs had readings of 0 mg/. ^{3} Hg with sniffe and α, β, and ga at bkg e.
													Rm 124 p pe e trench excavation, concrete slab / asphalt was remov, along with trench backfill to 3 ft. Trench excavated before borehole was drill.
										1			
										2			@2.5', top of pipe
										3		Pipe	3.0'
		HA to 3.0'		1.0/1.0		3F (10:51)				4		Silty Sand	(3.0-4.0) Silty Sand (SM) yellow brown (10YR 4/3), med, wet, vf-c grained 30-40% fines, LEK. 4.0'
		DP to 8.0'		2.0/4.0				Grout		5			(4.0-13.5) Gravelly Sand (SW) yellow brown, (10YR 5/4) dense, damp, vf-vc grained, 10-20% SA-SR gravels to 1-inch, MEK
						5F (11:00)				6	NR		
								Portland Cement		7		Gravelly Sand	
										8			
		DP to 12.0'		4.0/4.0				Type II		9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

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(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
						-10F (11:05)		Grout		10		
										11		
										12		
		DP to 16.0'		3.6 / 4.0				Type II-V Portland Cement		13		
										14		
										15		
						-15F (11:12)				16	NR	
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-R124-001

Notes:

Gravelly Sand, (SW), cont'd

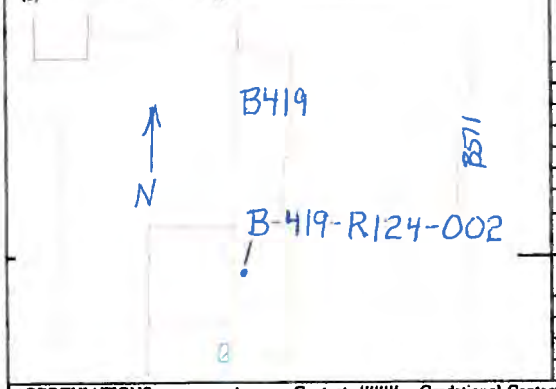
13.5

(13.5 – 16) Sand (SP), yellow brown (10YR 5/4) loose, firm, damp, vf-m grained, LEK = M.

T.D. = 16.0ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-R124-002

(4) Job No.: 33824-B419.3.3

(5) Logged By: Will McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL M2.5DP

(9) Drilling Contractor: Gregg Drilling / Martinez, CA

(10) Driller/Helper: Vince Pokrywka / Armando Torres

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand auger: 3.5-4'; Direct-Push: 4'-16'

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 3.5'-4' Final: 2 1/4-inch: 4'-16'

(16) Borehole Started, Time/Date: 9:32 / 9/19/2011

(17) Borehole Completed, Time/Date: 10:00 / 9/19/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------ = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
													Soil cores had readings of 0 mg/cm³ Hg with sniffer and α, β, and gamma at bkgd levels
													Rm 124 pipeline trench excavation, concrete slab was removed along with trench backfill to 3.5 ft. Trench excavated before start drilling borehole.
										1			
										2			
										3			3.5'
		HA to 4'		0.5/0.5		-3.5F (9:37)				4		Silty Clay	(3.5 - 5.5) Silty Clay, (CL), lite olive brown (2.5Y 5/4), firm, moist trace vf-m sand, LEK.
		DP to 8.0'		2.7/4.0				Grout		5			5.5'
						-5F (9:50)		Portland Cement		6		Gravelly Sand	(5.5 - 9.5) Gravelly Sand, (SW) yellow brown (10YR 5/4) dense, damp vf-c grained, 10-20% SA-SR gravel, to 3/4 inch, LEK-M.
										7	NR		
										8			
		DP to 12.0'		3.2/4.0				Type II-V		9			9.5'
										10		Sand	(9.5 - 16.0) Sand (SP), (10YR 5/4), loose damp, vf-f grained, L-MEK

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact
						-10F (9:59)		Type II-V Portland Cement Grout		10		
										11		Sand
											NR	
										12		
		DP TO 16.0'		4.0/4.0								Gravelly Sand
										13		
										14		
												Sand
						-15F (10:06)				15		
										16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-R124-002

Notes:

Sand (SP), cont'd

12.0'

@ 12-13.6 ft, gravelly sand Interbed

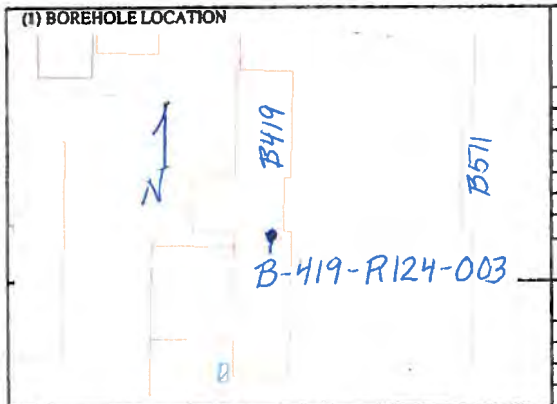
13.6'

@ 13.6 ft, sand as at 9.5 ft

T.D. = 16.0 ft

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Site Investigation

(3) Borehole/Well No.: B-419-R124-003

(4) Job No.: 33824-B419.3.3

(5) Logged By: W. M. McConihe

(6) Edited By: Mark Buscheck

(7) Project Manager: Valerie Morrow

(8) Drill Rig: MARL MZ.5DP

(9) Drilling Contractor: Gregg Drilling / Martinez, CA

(10) Driller/Helper: Vince Pokrywka / Armando Torres

(11) Drilling Method: Direct-Push

(12) Sample Method: Hand-auger: 2'-4'; Direct-Push: 4'-16'

(13) Hammer Weight/Drop: N/A

(14) Bentonite Gel Used: N/A

(15) Borehole Diameter, Pilot: 3 3/4-inch: 2'-4' Final: 2 1/4-inch: 4'-16'

(16) Borehole Started, Time/Date: 13:00 / 9/19/2011

(17) Borehole Completed, Time/Date: 13:20 / 9/19/11

(18) Water Source: B419 area hydrant

(19) Well Started, Time/Date: No well installed

(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft

(24) Casing Depth: N/A

(25) Screened Interval: N/A

(26) Sand Pack, #3: N/A #0/30: N/A

(27) Well Development Method: N/A

Time: — Date: — Flow Rate: —

(28) Geophysical Logs, Type: N/A By: — Date —

(29) Circulation: N/A

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	Soil core runs had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd levels
												Concrete	Concrete slab (0.6' thick) was sawcut and excavated trench backfill to examine drain pipe.
										1		Trench Backfill	@ 1.8 ft, top of drain pipe.
										2		Pipe	2.0
		HA to 4.0'		2.0/2.0						3		Gravel	(2-3) Gravel backfill of trench 3.0'
						3F (13:02)				4		Sandy Silt	(3.0-5.5) Sandy Silt (ML), gray-brown (10YR 5/2), silt, wet, 15-25% vf-vc sand trace gravel to 1/2-inch, LEK
		DP to 8.0'		1.25/4.0				Grout		5			Lower contact from driller. 5.
						5F (13:11)		Portland Cement		6	NR	Gravelly Sand	(5.5-14.6) Gravelly Sand (SW) yellow-brown (10YR 5/6), dense, dry, vf-vc gravel, 10-20% SA SR gravels to 1-inch, L-MEK.
										7			
										8			
		DP to 12.0'		3.6/4.0				Type II		9			
										10			

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; //////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL B419 RCRA Closure Phase II Site Investigation

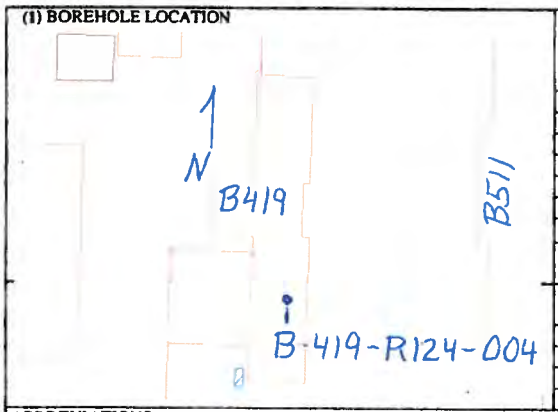
(3) Borehole/Well No.: B 419-R124-003

Notes:

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
						-10F (13:16)		Grout		10			Gravelly Sand (SW), cont'd
										11		Gravelly Sand	
										12	NR		
		DP to 16.0'		3.7/4.0				Type II-V Portland Cement					
										13			
										14			14.6
													(14.6-16) Sandy Silt (ML) light olive brown (2.5Y 5/4), brn, moist, 10-20% vf-f sand, LEK.
										15			
					-15F (13:26)					16	NR	Sandy Silt	
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Borehole/Well Construction Log

(1) BOREHOLE LOCATION



(2) Project: LLNL, B419 RCRA Closure Phase II Soil Investigation	(3) Borehole/Well No.: B-419-R124-004
	(4) Job No.: 33824-B419.3.3
(5) Logged By: Will McConihe	(6) Edited By: Mark Buscheck
(7) Project Manager: Valerie Marrow	(8) Drill Rig: MARL M25DP
(9) Drilling Contractor: Gregg Drilling / Martinez, CA	
(10) Driller/Helper: Vince Pokrywka / Armando Torres	
(11) Drilling Method: Direct-Push	(12) Sample Method: Hand auger: 2.5'-4'; Direct-Push 4'-16'
(13) Hammer Weight/Drop: N/A	(14) Bentonite Gel Used: N/A
(15) Borehole Diameter, Pilot: 3 3/4-inch: 2.5'-4'	Final: 2 1/4-inch: 4'-16'
(16) Borehole Started, Time/Date: 14:15 / 9/19/2011	(17) Borehole Completed, Time/Date: 14:35 / 9/19/11
	(18) Water Source: B438 area hydrant
(19) Well Started, Time/Date: No well installed	(20) Well Completed, Time/Date: N/A

(22) Water Depth	N/A	N/A	N/A	N/A
Boring/Casing Depth	—	—	—	—
Time	—	—	—	—
Date	—	—	—	—

(21) Well Head Completion: N/A

ABBREVIATIONS: ------ = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish. DP: Direct-Push

(23) Total Depth: 16.0 ft	(24) Casing Depth: N/A
(25) Screened Interval: N/A	
(26) Sand Pack, #3: N/A	#0/30: N/A
(27) Well Development Method: N/A	
Time: — Date: —	Flow Rate: —
(28) Geophysical Logs, Type: N/A By: — Date —	(29) Circulation: N/A

(42) LITHOLOGIC DESCRIPTIONS

Soil core runs had readings of 0 mg/cm³ with Hg sniffer and α, β, and gamma at bkgd level

(30) OVA/PID Field Readings (ppm)		(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42) LITHOLOGIC DESCRIPTIONS
Work Area	Soil/Rock	Sampler Type/Depth	Blows 6 inches	Inches Recovered/Inches Driven	(Sample Condition/RQD	Sample ID	Analysis	Well Annulus/Borehole Filler	Well Casing	Depth in Feet	Recovery/Sample Loc.	Contact	
												Concrete	Concrete slab (0.6' thick) was sawcut and
										1		Trench Backfill	excavated trench backfill to examine
										2			drain pipe.
													2.5'
		HA to 4.0'		1.5/1.5		-3F (14:20)		Type III-V Portland Cement Grout		3		Clayey Silt	
										4			
		DP to 8.0'		3.1/4.0						5			(2.5-9.7) Clayey Silt (ML), brown (10YR 4/3), firm, damp, trace vf-m sand, LEK
						-5F (14:28)				6			
										7			
											NR		
										8			
		DP to 12.0'		3.7/4.0						9			
													9.7'
										10		Sand	(9.7-15.0) Sand (SP), pale yellow

Note: Numbers 1–42 listed on this log correspond to Subsections 6.4.1–6.4.42 of SOP 1.1.

------- = Approx. Contact; ////// = Gradational Contact; @ = at; _____ = Definite Contact; 1 K = primary conductivity; 2 K = secondary conductivity due to fracturing, mineralization, etc.; A = angular; bl = blue; blk = black; brn = brown/brownish; c = coarse; calc = calcite; CIF = coring induced fracture; cmt = cemented; DA = Drill Ahead; def'm = deformation; DF = drilling fluid (mud); dk = dark; E = estimated; f = fine; FeOx= iron oxide; grn = green/greenish; gry = gray/grayish; H = high; HF = healed fracture; HIF = handling induced fracture; ind = indurated; K = Hydraulic conductivity; L = low; lt = light; m = medium; min = mineralization; MnO2 = manganese oxide; mod = moderate; NF = natural fracture; NR = No Recovery; P = plasticity; PC = punch core; ppm = parts per million; qtz = quartz; R = rounded; RC = rock core; RQD = rock quality description; rx w/HCl = reaction with hydrochloric acid; S = sub; SA = subangular; soft sed = soft sediment deformation; SR = subrounded; SS = split spoon; v = very; w/ = with; x-beds = cross beds; ylw = yellow/yellowish.

(2) Project: LLNL B419 RCRA Closure Phase II Soil Investigation

(3) Borehole/Well No.: B-419-R124-004

(30) OVA/PID Field Readings (ppm) Work Area	Soil/Rock	(31) Sampler Type/Depth	(32) Blows 6 inches	(33) Inches Recovered/Inches Driven	(34) Sample Condition/RQD	(35) Sample ID	(36) Analysis	(37) Well Annulus/Borehole Filler	(38) Well Casing	(39) Depth in Feet	(40) Recovery/Sample Loc.	(41) Contact	Notes:
						-10F (14:35)		Grout		10			(2.5Y 7/4), firm, dry, 1EK.
										11			
										12	NR		
		DP to 16.0'		4.0/4.0				Portland Cement		13		Sand	
										14			
								Type II-V		15			15'
						-15F (14:42)				16		Gravelly Sand	(15.0-16.0) Gravelly Sand (SP), yellow brown (10YR 7/4) firm, dry, vf-m grained, 10-20% SA-SR gravels to 3/4-inch, MEK.
										17			T.D. = 16.0 ft
										18			
										19			
										20			
										21			
										22			
										23			
										24			
										25			
										26			
										27			
										28			
										29			
										30			

Appendix H

Building 419 Background Sampling

Building 419 Background Sampling

Overview:

A project-specific background was developed for the B419 project. It consists of analytical results from soil samples from thirty-five randomly selected locations within the LLNL Livermore site perimeter. Samples were analyzed for TTLC metals and radioactivity, including gross alpha, gross beta, tritium, alpha spectroscopy, gamma spectroscopy, Carbon 14, Strontium 90, and Technetium 99.

The results were used (1) to develop background threshold (screening) values for use in the characterization phase of the project, and (2) as a reference set for comparison with post-excavation confirmation sampling results.

B419 Background Threshold Values

For use in the B419 Project LLNL developed a set of background threshold values (BTVs; EPA 2007a, 2007b) for total metals and radiological isotopes in soil. There were three steps to this process: (1) identify areas considered to be represent background for the Livermore Site; (2) collect and analyze samples from those areas; and (3) calculate background threshold values (BTVs; also referred to as screening values) from the analytical results.

To determine how many background samples to collect, LLNL used MARSSIM guidance for a Wilcoxon Rank Sum Test or Sign Test, using $\Delta/\sigma = 1$ and 5% for both the Type I and Type II errors. These design parameters imply that if an area of interest that in fact averages more than one standard deviation above background were to be compared with background (using either of these statistical tests), then there would be a high probability (95%) of correctly concluding that the area of interest is above background. The resulting number of background samples was $n = 32$ (MARSSIM Table I.2b). To account for the possibility of up to 10% lost samples, LLNL increased the number of samples to 35.

The sample locations (coordinates) were identified as follows:

1. Two hundred locations within the LLNL perimeter were generated using a random number generator.

2. Using a basemap showing locations of buildings, roads, etc., the two hundred random points were screened, and those that were inside buildings were removed.

3. The remaining 166 locations were reviewed by staff from the Environmental Restoration Division CERCLA remediation effort, and those considered to be inappropriate for use as background were flagged. Thirty-three of the 166 were eliminated by this review, leaving 133 potential sampling locations.

The remaining 133 locations were then available for background sampling. Due to potential inaccuracies in the basemap it was expected that some of the 133 locations might be in paved areas or otherwise inaccessible. If there was accessible soil within 25 feet of such a location, the location was adjusted in the field. Otherwise the location was discarded and the next location in the list was used. The sampling team was directed to proceed through the list sequentially, in order to preserve the randomness of the locations.

Since the number of discarded locations was unknown in advance of the sampling effort, the first 50 of the 133 locations, shown in Figure 1, were given to the sampling team. The remaining 83 locations were held in reserve; it turned out to be unnecessary to use any of them.

One composite sample was collected at each location using a hand auger at a depth between 6 inches to 2 feet below grade. Each sample was analyzed for TTLC metals and radioactivity, including gross alpha, gross beta, tritium, alpha spectroscopy, gamma spectroscopy, Carbon 14, Strontium 90, and Technetium 99).

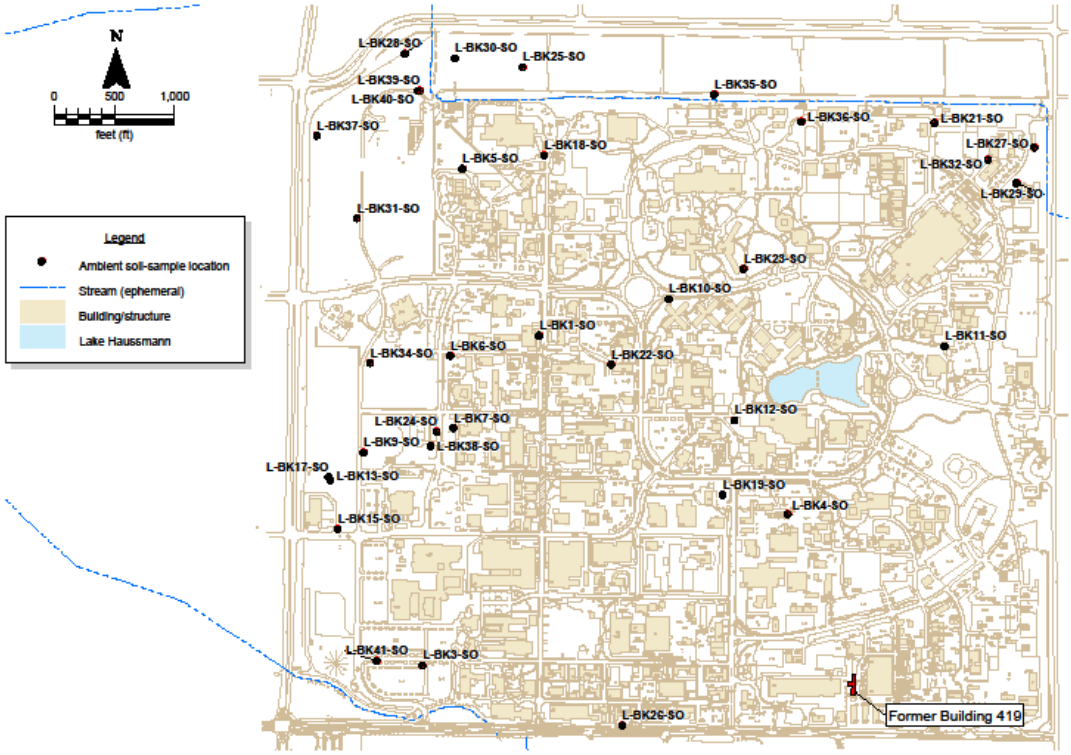


Figure 1. Fifty randomly selected sample locations on the Livermore Site.

As stated in EPA 2007b (page v), "… upper limits based upon background (or reference) data are used as estimates of BTVs, compliance limits (*CL*), or not-to-exceed values. These upper limits are often used in site (point-by-point) versus background comparison evaluations." BTVs are designed to represent a value that should rarely be exceeded by samples from background.

Specifically, LLNL chose to use the upper prediction limit (UPL) method for the normal distribution from EPA 2007b (Eq. 3-10 in Section 3.6.1 with $\alpha = 0.005$) to calculate BTVs. Samples from background should exceed such a BTV at a rate of approximately 1 in 200. The key to successful use of the UPL for a BTV is to determine whether the statistical model that underlies the UPL method fits the data. If it does not, then the exceedance rate in actual use could be substantially different from the intended rate.

LLNL first reviewed results for outliers and the number of results reported by the analytical laboratory as above the contract reporting limit (referred to as ">CRL"). One or two high outliers were excluded from four analytes. With one exception, the metals were either all >CRL, or did not have enough results >CRL for statistical calculations. The exception, mercury, had 21 out of 33 results >CRL (after excluding two outliers), and this was considered sufficient for statistical calculations. For radiological isotopes

LLNL required the laboratory to report estimated concentrations based on the underlying count data, even when the result was <CRL. These estimated concentrations were used.

After these reviews the statistical distribution of the results was examined. In general, the normal distribution was a good fit, although in some cases the fit was improved by the use of a transformation. The UPLs were then calculated; the results are shown in the table below.

Analyte	**Type**	**Average**	**Standard Deviation**	**Screening value**	**Units**
Antimony	Metal			2.2	mg/kg
Arsenic	Metal	4.24	1.21	7.59	mg/kg
Barium	Metal	202	47.1	332	mg/kg
Beryllium	Metal			0.55	mg/kg
Cadmium	Metal			0.55	mg/kg
Chromium	Metal	27.9	7.54	48.9	mg/kg
Cobalt	Metal	10.2	2.37	16.7	mg/kg
Copper	Metal	21.1	5.31	35.8	mg/kg
Hexavalent Chromium	Metal			2.2	mg/kg
Lead	Metal	7.88	2.29	14.3	mg/kg
Mercury	Metal	0.0416	0.0123	0.0759	mg/kg
Molybdenum	Metal			1.1	mg/kg
Nickel	Metal	39.6	11	70.1	mg/kg
Selenium	Metal			0.55	mg/kg
Silver	Metal			1.1	mg/kg
Thallium	Metal			1.1	mg/kg
Vanadium	Metal	27.8	5.76	43.7	mg/kg
Zinc	Metal	39.2	11.1	69.8	mg/kg
Actinium 228	Radiological	0.714	0.283	1.5	pCi/g
Aluminum 26	Radiological	0.00582	0.0458	0.133	pCi/g
Am 241 GS	Radiological	0.0315	0.183	0.539	pCi/g
Americium 241	Radiological	0.0345	0.00992	0.062	pCi/g
Antimony 124	Radiological	-0.00657	0.0549	0.145	pCi/g
Antimony 125	Radiological	0.00971	0.123	0.35	pCi/g
Beryllium 7	Radiological	0.0423	0.401	1.15	pCi/g
Bismuth 212	Radiological	0.863	0.599	2.52	pCi/g
Bismuth 214	Radiological	0.489	0.153	0.912	pCi/g
Carbon 14	Radiological	-2.06	4.43	10.2	pCi/g
Cerium 139	Radiological	0.00149	0.0275	0.0777	pCi/g
Cerium 144	Radiological	0.0317	0.215	0.626	pCi/g
Cesium 134	Radiological	-0.0166	0.0742	0.189	pCi/g
Cesium 137	Radiological	-0.0094	0.0611	0.16	pCi/g
Chromium 51	Radiological	-0.171	0.408	0.957	pCi/g
Cobalt 56	Radiological	0.064	0.132	0.428	pCi/g
Cobalt 57	Radiological	-0.000829	0.0201	0.0547	pCi/g

Analyte	Type	Average	Standard Deviation	Screening value	Units
Cobalt 58	Radiological	0.00131	0.065	0.181	pCi/g
Cobalt 60	Radiological	-0.00617	0.0579	0.154	pCi/g
Curium 242	Radiological	0.00229	0.00434	0.0143	pCi/g
Curium 244	Radiological	0.00837	0.00669	0.0269	pCi/g
Europium 152	Radiological	0.0949	0.284	0.88	pCi/g
Europium 154	Radiological	-0.0549	0.328	0.852	pCi/g
Europium 155	Radiological	0.0446	0.107	0.34	pCi/g
Gross alpha	Radiological	2.06	0.478	3.38	pCi/g
Gross beta	Radiological	2.72	0.63	4.47	pCi/g
Iodine 131	Radiological	0.0114	0.139	0.395	pCi/g
Iron 59	Radiological	-0.0211	0.152	0.399	pCi/g
Lead 212	Radiological	0.601	0.122	0.938	pCi/g
Lead 214	Radiological	0.557	0.104	0.844	pCi/g
Manganese 54	Radiological	0.00766	0.0547	0.159	pCi/g
Niobium 94	Radiological	-0.0134	0.0544	0.137	pCi/g
Niobium 95	Radiological	0.00234	0.0604	0.169	pCi/g
Plutonium 238	Radiological	0.0119	0.0085	0.0355	pCi/g
Plutonium 239+240	Radiological	0.0122	0.0122	0.046	pCi/g
Potassium 40	Radiological	11.6	2.47	18.4	pCi/g
Protactinium 234m	Radiological	1.89	10	29.6	pCi/g
Ruthenium 106	Radiological	-0.0889	0.486	1.25	pCi/g
Scandium 46	Radiological	-0.0135	0.0532	0.134	pCi/g
Silver 110m	Radiological	0.0016	0.0575	0.161	pCi/g
Sodium 22	Radiological	-0.00229	0.0687	0.188	pCi/g
Strontium 90	Radiological	0.0414	0.0803	0.264	pCi/g
Technetium 99	Radiological	-0.106	0.272	0.647	pCi/g
Thallium 208	Radiological	0.219	0.055	0.371	pCi/g
Thorium 227	Radiological	-0.207	0.455	1.05	pCi/g
Thorium 228	Radiological	0.721	0.0979	0.991	pCi/g
Thorium 230	Radiological	0.674	0.102	0.957	pCi/g
Thorium 232	Radiological	0.687	0.107	0.983	pCi/g
Thorium 234	Radiological	0.537	0.689	2.44	pCi/g
Tritium	Radiological	0.0218	0.0304	0.106	pCi/g
Uranium 234 and Uranium 233	Radiological	0.554	0.0744	0.76	pCi/g
Uranium 235	Radiological	-0.00886	0.236	0.645	pCi/g
Uranium 235 and Uranium 236	Radiological	0.0417	0.0176	0.0904	pCi/g
Uranium 238	Radiological	0.541	0.0637	0.717	pCi/g
Zinc 65	Radiological	-0.173	0.157	0.261	pCi/g

References

EPA 2007a. *ProUCL Version 4.0 User Guide*, EPA/600/R-07/038, 2007.

EPA 2007b. *ProUCL Version 4.0 Technical Guide*, EPA/600/R-07/041, 2007.

Appendix I

MSDS and Product Data Sheet for Fixative

MATERIAL SAFETY DATA SHEET

MSDS DATE: 03/14/12

ABC® ASBESTOS BINDING COMPOUND

Per OSHA-recommended ANSI Z400.1-2004 standard format & in accordance with European standard format

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name: ABC® Asbestos Binding Compound
Product Description: Asbestos Binding Compound - Green
Product Code: 6423

Manufacturer: Fiberlock Technologies, Inc.
Address:
Fiberlock Technologies
150 Dascomb Road
Andover MA, 01810

Contact Info:
Tel: (800) 342-3755
Fax: (978) 475-6205

Emergency Phone: 24 Hour Contact: CHEM-TEL: (800) 255-3924 (Contract Number: MIS0001450)
INTERNATIONAL 24 HOUR EMERGENCY Phone: 813-248-0585

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Non-hazardous:
Pigmented Latex emulsion coating comprised of water, pigments, fillers, additives, and latex emulsion resin.

Hazardous:

Chemical Name	CAS#	Percent	Exposure Limits
1 - Titanium dioxide	13463-67-7	< 25.0	ACGIH TLV 10 mg/m^3 as Dust OSHA PEL 10 mg/m^3 as Total Dust 5 mg/m^3 Respirable Fraction

Note: Normal application procedures pose no hazard since titanium dioxide is wetted and encapsulated, but grinding or sanding dried films of this product may yield respirable titanium dioxide dust. Control exposures to less than 0.1 mg/m3 using NIOSH-approved dust filter respirators.

Note: Per 29CFR 1910.1200 (g) (2) (1) (C) (2), only hazardous substances present in excess of 1.0% by weight (or 0.1% for carcinogens) must be listed on an MSDS.

SECTION 3: HAZARDS IDENTIFICATION

Emergency Overview:

Product Description: This product is a pigmented liquid.

Health Hazards:
Eyes: May cause slight irritation.
Skin: Substance may cause slight skin irritation.
Inhalation: May cause irritation of respiratory tract.
Ingestion: Ingestion may cause gastrointestinal irritation, nausea, and vomitting.

Flammability Hazards: This product is not flammable. If this product is involved in a fire, the decomposition products generated will include irritating vapors and gases and some carbon monoxide.

Reactivity Hazards: This product is not reactive.

Environmental Hazards: Although release of this product to the environment is not expected to cause significant adverse effect, all releases should be avoided.

SECTION 4: FIRST AID MEASURES

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes and consult physician.

Skin: Wash skin thoroughly with soap and water. If drenched with product, remove and wash clothing before reuse.

Ingestion: Ingestion If victim is conscious give 2 glasses of water. Call a physician.

Inhalation: N/A

SECTION 5: FIRE-FIGHTING MEASURES

Product is non-combustible.

Flash point:

F: Not flammable
C: Not flammable

Autoignition Temperature:

F: Not Established
C: Not Established

Extinguishing Media:

Use extinguishing media appropriate for surrounding fire

Water Spray	OK
Carbon Dioxide	OK
Foam	OK
Dry Chemical	OK
Halon	OK
Other	Any “ABC” Class

SECTION 6: ACCIDENTAL RELEASE MEASURES

Accidental Release Measures:

Personal Precautions: Do not get in eyes. Do not take internally. Avoid skin contact. Prevent prolonged or repeated breathing of vapor or spray mists. Keep unnecessary people away. Floor may be slippery, use care to avoid falling. Ventilate the area. Remove with inert absorbent.

Environmental Precautions: Keep spills and cleaning run-offs out of municipal sewers and open bodies of water. Comply with local, state and national regulations.

SECTION 7: HANDLING AND STORAGE

Handling and Storage:

Storage: Store in a cool, dry place
Keep closure tight and containers upright to prevent leakage.

Precautionary labeling: “KEEP FROM FREEZING”.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Precautions:
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed “as Dust” in Section 2) which may be present at hazardous levels only during the sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 10 mg/m3 (total dust), 5 mg/m3 (respirable fraction).

Work Hygienic Practices: Avoid contact with skin. Do not get in eyes. Do not take internally. Avoid breathing vapors or spray mists.

Ventilation: Use in well-ventilated areas. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

Respiratory Protection: If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2. When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

Eye Protection: Use approved safety eyewear including side shields, chemical goggles or face shields.

Skin Protection: Wear neoprene or rubber gloves to prevent skin contact if prolonged skin contact is likely. Wash hands before eating, smoking or using the wash room.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Viscous liquid	**Viscosity @ 77°F:**	60-75 Kreb Units ± 5.0
Odor:	Slight odor	**Percent Solids By Weight:**	51.4% ± 2.0.0
Boiling Point:	212°F	**Solubility in Water:**	Total
Freezing Point:	32°F	**Vapor Density @ 68°F:**	Heavier than air
Vapor Pressure (mmHg) @ 68°F:	17	**Specific Gravity (H2O = 1) @ 68°F:**	1.1 ± 0.1
Weight Per Gallon:	9.0 lbs/gal ± 0.5	**Evaporation Rate:**	Slower than ether

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable

Incompatibility: (Material to Avoid): Avoid contact with strong oxidizing agents (e.g. nitric acid, permanganates), etc.

Hazardous Decomposition or By-Products: Some carbon monoxide.

Hazardous Polymerization: Will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological Information:

Chronic Health Hazards

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

Toxicology Data

Chemical Name	CAS No.	LD50
Titanium dioxide	13463-67-7	Oral: >24000 mg/kg (Rat) Dermal: >10000 mg/m^3 (rabbit) Inhalation (Dust): >6.82 mg/L (Rat, 4hr.)

SECTION 12: ECOLOGICAL INFORMATION

Ecological Information:

No Data Available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. If incinerating, do so in an approved facility, and do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14: TRANSPORT INFORMATION

U.S. Department of Transportation

Proper Shipping Name: Non-Hazardous Water-Based Paint
Hazard Class: "Not Regulated"
Label Statement: "Keep From Freezing"
Class 55 Non-Hazardous Water-Based Paint

Canada (TDG)
Not Regulated for Transportation.

IMO
Not Regulated for Transportation.

SECTION 15: REGULATORY INFORMATION

U.S. Federal Regulations:

TSCA (TOXIC SUBSTANCE CONTROL ACT): All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT): Releases of this material to air, land, or water are not reportable to the National Response Center under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to state and local emergency planning committees under the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304.

SARA TITLE III: No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Components of this product are on the California Proposition 65 lists.

Titanium Dioxide is subject to the reporting requirements of Section 313 of the Emergency Planning and Community-Right-To-Know Act of 1986 and of 40 CFR 372.

CANADA DSL: All components are listed or exempt.

SECTION 16: OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

To comply with New Jersey DOH Right-To-Know labeling law (NJAC 8:59 – 5.1 & 5.2)

CAS. No.:	CHEMICAL INGREDIENTS
7732-18-5	Water
13463-67-7	Titanium dioxide
25265-77-4	2, 2, 4-Trimethyl-1-3, pentanediol monoisobutyrate
Not Available +	Proprietary surfactant
Not Available +	Latex resin solids
(+) Contents Partially Unknown	

HMIS HAZARD RATING			
Health 1	Flammability 0	Physical Hazard 0	Personal Protection A
HAZARD INDEX: 0=Minimal, 1=Slight, 2=Moderate, 3=Serious, 4=Severe			
PERSONAL PROTECTION CODE:			
A=Safety glasses			

Warning! If you scrape, sand or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH-approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hot line at 1-800-424-LEAD (5323) or log on to: www.epa.gov/lead

FIBERLOCK TECHNOLOGIES

PRODUCT DATA SHEET

ABC®

Asbestos Encapsulant/Sealant

ABC
Asbestos Abatement Products

Product Description

6421-Off White, 6423-Green, 6422-Clear

ABC Asbestos Binding Compound is a high solids asbestos encapsulant/sealant, designed to encapsulate friable Asbestos Containing Material (ACM) such as fireproofing and insulation material. ABC is an important tool for coping with the health hazards associated with exposure to asbestos fibers. In 1978, ABC was tested for the EPA under contract #68-03-2552-T2005 by Battelle Laboratories of Columbus, Ohio, and found to meet the requirements for the effective encapsulation and removal of ACM. The high solids, nonflammable composition of ABC allows for dilution with water to provide maximum flexibility for specific asbestos abatement needs, including lockdown/removal, penetrating encapsulation and bridging encapsulation. ABC is also an effective tool for controlling the documented health hazard of exposure to asbestos fibers found present in soil.

Application Information

SURFACE PREPARATION

Warning! If you scrape, sand, or remove old paint from any surface, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH approved respirator to control lead exposure. Carefully clean up with a wet mop or HEPA vacuum. Before you start, find out how to protect yourself and you family by contacting the U.S. EPA/Lead Information Hotline at 1-800-424-LEAD (5323) or log on to www.epa.gov/lead.

Prior to application it is important to determine if the existing asbestos matrix is well adhered to the substrate. Correct any surface defects and clean all surfaces thoroughly. Be careful not to agitate asbestos fibers during preparation; this could increase asbestos exposure. Stir ABC thoroughly to achieve a uniform consistency. ABC may be diluted with water for different applications.

APPLICATION TOOLS

Professional models of all brands of airless spray equipment can be used to successfully apply ABC. Use the settings below when applying ABC:

PENETRATING
Pressure: 1300 - 1400 P.S.I.
Tip: .017 - .031
BRIDGING
Pressure: 2200 - 3000 P.S.I.
Tip: .017 - .023
REMOVAL/LOCKDOWN
Pressure: 2200 - 2300 P.S.I.
Tip: .015 - .025

PRODUCT APPLICATION

ENCAPSULATION INSTRUCTIONS

PENETRANT- For most fibrous asbestos applications such as "cotton candy" style fireproofing or compressed acoustic material less than 2 inches thick, add 1 part water to 1 part ABC. Using the proper spray equipment settings listed, apply ABC to the ACM until saturated. Multiple passes may be required, allowing time between passes for dissipation of the solution into the matrix. Full saturation is achieved when the ACM will not absorb any more of the encapsulant into the matrix. Coverage, depending on thickness and porosity of the material, can vary between 50 - 75 sq. ft./gal.

BRIDGING AGENT- A qualified asbestos professional should determine the necessary dry film thickness for individual abatement projects. The necessary dry film thickness of a bridging encapsulant for asbestos containing materials (ACM) will vary from project to project as ACM can have a wide range of characteristics, including density, porosity, and surface profile. In the EPA's Guidance for Controlling Asbestos-Containing Materials in Buildings (EPA 560 / 5-84024, June 1985), the primary instruction regarding dry film thickness states that when encapsulating ACM, the coating is to be applied

Properties

Product Specifications

Solids by Weight ± 2%:	51.4%
Solids by Volume ± 2%:	44.0%
Viscosity at 70°F:	60-75 Kreb Units
Specular Gloss:	82º ± 5 @ 60º
Flash Point:	Non-combustible
Shelf Life:	36 Months Min. (Original Sealed Containers)
Calculated VOC:	56-64* grams/liter

* ABC Calculated VOC dependent on color

ABC complies with the requirements for LEED® EQ Credit 4.2, low-emitting materials: paints and coatings.

Coverage

Smooth Surfaces:	50-100 ft^2/gal
Porous Surfaces:	50-75 ft^2/gal

Drying Times (@ 70 - 77°F , 50% R.H.)

To Touch:	1-2 hours
To Recoat:	12-24 hours
Minimum Application Temperature:	50°F (10°C)

Available Package Sizes

5 gallon containers	
Weight Per Gallon ± 0.5 lbs:	9.6 lbs/gal

Product Testing

Fire Rating:	ASTM E84 Class A
Flame Spread:	10
Fuel Contribution:	10
Smoke Density:	5
Test Facility:	Southwest Research Institute

green LOW VOC focus

green LEED® CREDIT focus

SPRAY SETTINGS FIBERLOCK TECHNOLOGIES 2200-3000 PSI .017-.023 TIP SIZE Fiberlock Recommends TITAN® Sprayers

U.S. GREEN BUILDING COUNCIL MEMBER

*LEED® and related logo is a trademark owned by the U.S. Green Building Council and is used by permission.

ABC

Asbestos Encapsulant/Sealant **6421 - Off White, 6243 - Green, 6422 - Clear**

Application Information

"considerably thicker than recommended for painting. Coverage should be no more than 100 sq. ft. per gallon and should create a continuous, unbroken coating" (Section 5.1.3, page 5-8).
For bridging applications, apply ABC at full strength with an airless sprayer in accordance with the settings listed below. Typical bridging applications are applied at a coverage rate of 75-100 sq. ft./gallon, which yields a dry film thickness between 6-10 mils on hard, cementitious ACM. For more information, contact Fiberlock or visit our website for the complete Specification for ABC.

REMOVAL/LOCKDOWN
Removal is recommended for loosely adhered ACM. Mix 4 parts water to 1 part ABC and apply to ACM. ABC will facilitate removal by penetrating into the ACM keeping it moist and sticky. After the ACM has been removed, apply 1 part ABC diluted with 1 part water to seal residual fibers left on substrate.

SOIL ENCAPSULATION INSTRUCTIONS
PENETRANT – For encapsulation of soil contaminated with asbestos, mix one part ABC with one part water. Apply as a penetrating encapsulant to increase the dimensional stability of the soil, while reducing its porosity. For heavy clay or hard packed soils, the dilution rate may need to be increased to 2 parts water to one part ABC to improve penetration. Porous soils, such as those with high sand or gravel content, may require more product per square foot, or multiple applications of penetrating encapsulant solution.

BRIDGING AGENT – Apply ABC full strength as a bridging encapsulant. Dry film thickness and application rate should be determined by a qualified asbestos professional as appropriate to the project site and goals.

COVERAGE

Coverage depends on thickness and porosity of the material.
Penetrant: 50-75 ft^2 per gallon
Penetrant (Soil): 30-35 ft^2 per gallon
Bridging Agent: 75-100 ft^2 per gallon
Bridging Agent (Soil): 75-100 ft^2 per gallon

DRYING TIME @ 70°F 50% R.H

To Touch – 1-2 hours
Drying time will vary based on thickness and porosity of the ACM being encapsulated.

CLEANUP

Tools and drippings should be cleaned with warm soapy water before coating dries. Follow equipment manufacturer's directions to clean spray equipment. Dispose of all waste according to current Local, State and Federal regulations.

PRECAUTIONS

Store in a dry place at temperatures between 40°F and 100°F. Approved respirators must be used to prevent inhalation of asbestos fibers that may be present in the air. Protective clothing should be worn.

Careful consideration should be given to all EPA, OSHA, and State regulations in effect at the time of application of ABC. The EPA, through the Office of Pesticides and Toxic Substances, has issued a report headed "Guidance for Controlling Friable Asbestos Containing Materials in Buildings", EPA 560/5 85-024 June 1985, containing the proper data, cautions, and procedures for asbestos control. Copies are available from: TSCA Industry Asst. Office, EPA TS- 799, 401 M Street SW, Washington, DC 20460, (202) 554-1404.

CAUTION!
KEEP OUT OF REACH OF CHILDREN.
Do not take internally. Close container after each use.
Keep from freezing
24 hour Emergency "CHEM-TEL" - 800.255.3924

For Technical Information call 800.342.3755

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use of this product are beyond our control. Neither Fiberlock Technologeies, Inc., nor its agents shall be responsible for the use or results of use of this product or any injury, loss or damage, direct or consequential. We recommend that the prospective user determine the suitability of this product for each specific project and for the health and safety of personnel working in the area.

1000-3518

Appendix J

Soil Sample Reports

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-001	1	Mercury	0.26	mg/kg	0.0759	10	
B-419-001	5	Mercury	0.11	mg/kg	0.0759	10	
B-419-001	10	Mercury	0.078	mg/kg	0.0759	10	
B-419-001	2	Selenium	0.62	mg/kg	0.55	390	
B-419-001	1	Tritium	102	pCi/g	0.106	110	
B-419-001	2	Tritium	62.7	pCi/g	0.106	110	
B-419-001	5	Tritium	18.4	pCi/g	0.106	110	
B-419-001	10	Tritium	3.93	pCi/g	0.106	110	
B-419-001	15	Tritium	1.49	pCi/g	0.106	110	
B-419-002	1	Mercury	1.1	mg/kg	0.0759	10	
B-419-002	5	Mercury	0.12	mg/kg	0.0759	10	
B-419-002	10	Mercury	0.079	mg/kg	0.0759	10	
B-419-002	1	Tritium	117	pCi/g	0.106	110	Y
B-419-002	2	Tritium	96	pCi/g	0.106	110	
B-419-002	5	Tritium	14.3	pCi/g	0.106	110	
B-419-002	10	Tritium	59.2	pCi/g	0.106	110	
B-419-002	15	Tritium	141	pCi/g	0.106	110	Y
B-419-003	1	Mercury	0.1	mg/kg	0.0759	10	
B-419-003	2	Mercury	0.21	mg/kg	0.0759	10	
B-419-003	5	Mercury	0.29	mg/kg	0.0759	10	
B-419-003	9.5	Mercury	0.11	mg/kg	0.0759	10	
B-419-003	1	Tritium	25.5	pCi/g	0.106	110	
B-419-003	2	Tritium	21.1	pCi/g	0.106	110	
B-419-003	5	Tritium	89	pCi/g	0.106	110	
B-419-003	9.5	Tritium	21.9	pCi/g	0.106	110	
B-419-003	15	Tritium	34.6	pCi/g	0.106	110	
B-419-004	2	Beryllium	5	mg/kg	0.55	160	
B-419-004	5	Beryllium	1.3	mg/kg	0.55	160	
B-419-004	15	Cadmium	0.66	mg/kg	0.55	70	
B-419-004	15	Chromium	49	mg/kg	48.9	48.9	Y
B-419-004	1	Gross alpha	3.5	pCi/g	3.38	3.38	Y
B-419-004	2	Gross alpha	11.5	pCi/g	3.38	3.38	Y
B-419-004	5	Gross alpha	5.5	pCi/g	3.38	3.38	Y
B-419-004	10	Gross alpha	5.7	pCi/g	3.38	3.38	Y
B-419-004	15	Gross alpha	3.9	pCi/g	3.38	3.38	Y
B-419-004	2	Gross beta	6.5	pCi/g	4.47	4.47	Y
B-419-004	10	Gross beta	4.8	pCi/g	4.47	4.47	Y
B-419-004	2	Lead	99	mg/kg	14.3	400	
B-419-004	5	Lead	22	mg/kg	14.3	400	
B-419-004	10	Lead	19	mg/kg	14.3	400	
B-419-004	15	Lead	160	mg/kg	14.3	400	
B-419-004	1	Mercury	0.67	mg/kg	0.0759	10	
B-419-004	2	Mercury	7.3	mg/kg	0.0759	10	
B-419-004	5	Mercury	3.1	mg/kg	0.0759	10	
B-419-004	10	Mercury	0.27	mg/kg	0.0759	10	
B-419-004	15	Mercury	0.49	mg/kg	0.0759	10	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-004	1	PCB 1248	0.35	mg/kg	-	0.22	Y
B-419-004	2	PCB 1248	0.31	mg/kg	-	0.22	Y
B-419-004	1	Selenium	0.59	mg/kg	0.55	390	
B-419-004	2	Selenium	0.7	mg/kg	0.55	390	
B-419-004	15	Tetrachloroethene	0.0051	mg/kg	-	0.55	
B-419-004	15	Thallium	1.2	mg/kg	1.1	5	
B-419-004	1	Tritium	100	pCi/g	0.106	110	
B-419-004	2	Tritium	358	pCi/g	0.106	110	Y
B-419-004	5	Tritium	646	pCi/g	0.106	110	Y
B-419-004	10	Tritium	1920	pCi/g	0.106	110	Y
B-419-004	15	Tritium	554	pCi/g	0.106	110	Y
B-419-005	10	Gross alpha	4.1	pCi/g	3.38	3.38	Y
B-419-005	2	Mercury	0.12	mg/kg	0.0759	10	
B-419-005	2	Mercury	0.12	mg/kg	0.0759	10	
B-419-005	5	Mercury	0.35	mg/kg	0.0759	10	
B-419-005	10	Mercury	0.37	mg/kg	0.0759	10	
B-419-005	15	Mercury	0.13	mg/kg	0.0759	10	
B-419-005	1	Methylene chloride	0.0074	mg/kg	-	11	
B-419-005	5	PCB 1254	0.056	mg/kg	-	0.22	
B-419-005	10	PCB 1254	0.1	mg/kg	-	0.22	
B-419-005	15	PCB 1254	0.062	mg/kg	-	0.22	
B-419-005	1	Tritium	11.5	pCi/g	0.106	110	
B-419-005	2	Tritium	9.7	pCi/g	0.106	110	
B-419-005	2	Tritium	10.9	pCi/g	0.106	110	
B-419-005	5	Tritium	313	pCi/g	0.106	110	Y
B-419-005	10	Tritium	218	pCi/g	0.106	110	Y
B-419-005	15	Tritium	258	pCi/g	0.106	110	Y
B-419-006	10	Mercury	0.076	mg/kg	0.0759	10	
B-419-006	15	Mercury	0.09	mg/kg	0.0759	10	
B-419-006	1	Selenium	0.58	mg/kg	0.55	390	
B-419-006	2	Selenium	0.58	mg/kg	0.55	390	
B-419-006	5	Thallium	1.2	mg/kg	1.1	5	
B-419-006	1	Tritium	52.1	pCi/g	0.106	110	
B-419-006	2	Tritium	110	pCi/g	0.106	110	
B-419-006	5	Tritium	234	pCi/g	0.106	110	Y
B-419-006	10	Tritium	153	pCi/g	0.106	110	Y
B-419-006	15	Tritium	55.2	pCi/g	0.106	110	
B-419-007	5	Mercury	0.1	mg/kg	0.0759	10	
B-419-007	10	Mercury	0.089	mg/kg	0.0759	10	
B-419-007	1	Tritium	163	pCi/g	0.106	110	Y
B-419-007	2	Tritium	307	pCi/g	0.106	110	Y
B-419-007	5	Tritium	226	pCi/g	0.106	110	Y
B-419-007	10	Tritium	343	pCi/g	0.106	110	Y
B-419-007	15	Tritium	660	pCi/g	0.106	110	Y
B-419-008	1	Bis(2-ethylhexyl)phthalate	0.36	mg/kg	-	35	
B-419-008	5	Mercury	0.11	mg/kg	0.0759	10	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-008	10	Mercury	0.092	mg/kg	0.0759	10	
B-419-008	1	Tritium	4.05	pCi/g	0.106	110	
B-419-008	2	Tritium	4.49	pCi/g	0.106	110	
B-419-008	5	Tritium	4.32	pCi/g	0.106	110	
B-419-008	10	Tritium	1.65	pCi/g	0.106	110	
B-419-008	15	Tritium	1.15	pCi/g	0.106	110	
B-419-010	10	Barium	940	mg/kg	332	15000	
B-419-010	10	Cadmium	1.1	mg/kg	0.55	70	
B-419-010	5	Mercury	0.1	mg/kg	0.0759	10	
B-419-010	10	Molybdenum	1.7	mg/kg	1.1	390	
B-419-010	1	Nickel	160	mg/kg	70.1	1500	
B-419-010	10	Nickel	140	mg/kg	70.1	1500	
B-419-010	2	Tritium	0.47	pCi/g	0.106	110	
B-419-010	5	Tritium	0.372	pCi/g	0.106	110	
B-419-011	15	Chromium	230	mg/kg	48.9	48.9	Y
B-419-011	5	Mercury	0.076	mg/kg	0.0759	10	
B-419-011	10	Mercury	0.089	mg/kg	0.0759	10	
B-419-011	10	Mercury	0.097	mg/kg	0.0759	10	
B-419-011	15	Nickel	170	mg/kg	70.1	1500	
B-419-011	1	Tritium	1.33	pCi/g	0.106	110	
B-419-011	2	Tritium	1.7	pCi/g	0.106	110	
B-419-011	5	Tritium	1.07	pCi/g	0.106	110	
B-419-011	10	Tritium	0.332	pCi/g	0.106	110	
B-419-012	11	Barium	640	mg/kg	332	15000	
B-419-012	1	Chromium	54	mg/kg	48.9	48.9	Y
B-419-012	11	Mercury	0.077	mg/kg	0.0759	10	
B-419-012	1	Molybdenum	4.2	mg/kg	1.1	390	
B-419-013	5	Mercury	0.14	mg/kg	0.0759	10	
B-419-013	10	Mercury	0.076	mg/kg	0.0759	10	
B-419-013	1	Tritium	0.314	pCi/g	0.106	110	
B-419-013	2	Tritium	0.257	pCi/g	0.106	110	
B-419-013	15	Tritium	0.84	pCi/g	0.106	110	
B-419-014	1	Hexavalent Chromium	3.5	mg/kg	2.2	2.2	Y
B-419-014	2	Lead	20	mg/kg	14.3	400	
B-419-014	1	Tritium	1.3	pCi/g	0.106	110	
B-419-014	2	Tritium	1.05	pCi/g	0.106	110	
B-419-014A	2	Bis(2-ethylhexyl)phthalate	5.9	mg/kg	-	35	
B-419-014A	1	Chromium	55	mg/kg	48.9	48.9	Y
B-419-014A	2	Chromium	72	mg/kg	48.9	48.9	Y
B-419-014A	2	Chromium	64	mg/kg	48.9	48.9	Y
B-419-014A	2	Cobalt	19	mg/kg	16.7	660	
B-419-014A	2	Cobalt	18	mg/kg	16.7	660	
B-419-014A	1	Copper	36	mg/kg	35.8	3100	
B-419-014A	1	Nickel	160	mg/kg	70.1	1500	
B-419-014A	2	Nickel	200	mg/kg	70.1	1500	
B-419-014A	2	Nickel	200	mg/kg	70.1	1500	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-014A	1	Tritium	0.68	pCi/g	0.106	110	
B-419-014A	2	Tritium	0.85	pCi/g	0.106	110	
B-419-014A	2	Tritium	1.01	pCi/g	0.106	110	
B-419-014A	5	Tritium	0.365	pCi/g	0.106	110	
B-419-015A	10	Arsenic	37	mg/kg	7.59	11	Y
B-419-015A	1	Barium	360	mg/kg	332	15000	
B-419-015A	2	Barium	380	mg/kg	332	15000	
B-419-015A	10	Barium	1000	mg/kg	332	15000	
B-419-015A	10	Chromium	230	mg/kg	48.9	48.9	Y
B-419-015A	10	Cobalt	60	mg/kg	16.7	660	
B-419-015A	10	Copper	120	mg/kg	35.8	3100	
B-419-015A	10	Lead	44	mg/kg	14.3	400	
B-419-015A	5	Mercury	0.077	mg/kg	0.0759	10	
B-419-015A	10	Nickel	280	mg/kg	70.1	1500	
B-419-015A	2	Tritium	1.19	pCi/g	0.106	110	
B-419-015A	5	Tritium	0.88	pCi/g	0.106	110	
B-419-015A	15	Tritium	0.426	pCi/g	0.106	110	
B-419-015A	10	Vanadium	180	mg/kg	43.7	390	
B-419-015A	1	Zinc	150	mg/kg	69.8	23000	
B-419-015A	2	Zinc	140	mg/kg	69.8	23000	
B-419-015A	10	Zinc	280	mg/kg	69.8	23000	
B-419-016A	10	Arsenic	11	mg/kg	7.59	11	
B-419-016A	1	Lead	23	mg/kg	14.3	400	
B-419-016A	10	Mercury	0.085	mg/kg	0.0759	10	
B-419-016A	1	Tritium	0.444	pCi/g	0.106	110	
B-419-016A	2	Tritium	2.39	pCi/g	0.106	110	
B-419-016A	5	Tritium	2.2	pCi/g	0.106	110	
B-419-016A	10	Tritium	0.336	pCi/g	0.106	110	
B-419-017	15	Mercury	0.79	mg/kg	0.0759	10	
B-419-017	0.8	Tritium	0.55	pCi/g	0.106	110	
B-419-017	4.5	Tritium	0.64	pCi/g	0.106	110	
B-419-017	10	Tritium	0.419	pCi/g	0.106	110	
B-419-017	15	Tritium	1.82	pCi/g	0.106	110	
B-419-017A	2	Molybdenum	5.6	mg/kg	1.1	390	
B-419-017A	2	Tritium	1.25	pCi/g	0.106	110	
B-419-018	3	Acetone	0.03	mg/kg	-	61000	
B-419-018	3	Benzene	0.024	mg/kg	-	1.1	
B-419-018	1	Chromium	70	mg/kg	48.9	48.9	Y
B-419-018	1	Chromium	93	mg/kg	48.9	48.9	Y
B-419-018	3	Chromium	51	mg/kg	48.9	48.9	Y
B-419-018	3	Chromium	85	mg/kg	48.9	48.9	Y
B-419-018	11	Chromium	53	mg/kg	48.9	48.9	Y
B-419-018	3	m- and p-Xylene Isomers	0.0089	mg/kg	-	630	
B-419-018	3	Mercury	0.078	mg/kg	0.0759	10	
B-419-018	3	Mercury	0.11	mg/kg	0.0759	10	
B-419-018	6	Mercury	0.076	mg/kg	0.0759	10	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-018	3	Naphthalene	0.007	mg/kg	-	3.6	
B-419-018	3	Toluene	0.023	mg/kg	-	5000	
B-419-019	0.8	Tritium	0.215	pCi/g	0.106	110	
B-419-019	4	Tritium	0.75	pCi/g	0.106	110	
B-419-020	0.8	Tritium	0.61	pCi/g	0.106	110	
B-419-020	4	Tritium	0.472	pCi/g	0.106	110	
B-419-020	6	Tritium	0.87	pCi/g	0.106	110	
B-419-021	1.3	Gross alpha	14.1	pCi/g	3.38	3.38	Y
B-419-021	1.3	Gross beta	8.9	pCi/g	4.47	4.47	Y
B-419-021	4	Lead	96	mg/kg	14.3	400	
B-419-021	4	Mercury	0.078	mg/kg	0.0759	10	
B-419-021	7	Mercury	0.085	mg/kg	0.0759	10	
B-419-021	1.3	Tritium	9.8	pCi/g	0.106	110	
B-419-021	4	Tritium	2.31	pCi/g	0.106	110	
B-419-021	7	Tritium	1.47	pCi/g	0.106	110	
B-419-021	9	Tritium	0.55	pCi/g	0.106	110	
B-419-021	15	Tritium	0.28	pCi/g	0.106	110	
B-419-022	2	Selenium	0.73	mg/kg	0.55	390	
B-419-022	5	Selenium	0.74	mg/kg	0.55	390	
B-419-022	10	Selenium	0.6	mg/kg	0.55	390	
B-419-022	2	Tritium	0.6	pCi/g	0.106	110	
B-419-022	5	Tritium	0.392	pCi/g	0.106	110	
B-419-023	15	Mercury	0.12	mg/kg	0.0759	10	
B-419-023	2	Selenium	0.57	mg/kg	0.55	390	
B-419-023	2	Tritium	0.57	pCi/g	0.106	110	
B-419-023	5	Tritium	1.33	pCi/g	0.106	110	
B-419-024	1	Americium 241	0.68	pCi/g	0.062	1.8	
B-419-024	1	Americium 241	0.77	pCi/g	0.062	1.8	
B-419-024	1	Beryllium	0.74	mg/kg	0.55	160	
B-419-024	2.5	Beryllium	0.56	mg/kg	0.55	160	
B-419-024	2.5	Bis(2-ethylhexyl)phthalate	1.2	mg/kg	-	35	
B-419-024	5	Bis(2-ethylhexyl)phthalate	0.46	mg/kg	-	35	
B-419-024	1	Gross alpha	9.8	pCi/g	3.38	3.38	Y
B-419-024	2.5	Gross alpha	8.6	pCi/g	3.38	3.38	Y
B-419-024	1	Lead	16	mg/kg	14.3	400	
B-419-024	2.5	Lead	61	mg/kg	14.3	400	
B-419-024	1	Mercury	0.28	mg/kg	0.0759	10	
B-419-024	2.5	Mercury	0.6	mg/kg	0.0759	10	
B-419-024	5	Mercury	0.12	mg/kg	0.0759	10	
B-419-024	1	PCB 1254	3.1	mg/kg	-	0.22	Y
B-419-024	2.5	PCB 1254	6.9	mg/kg	-	0.22	Y
B-419-024	5	PCB 1254	1	mg/kg	-	0.22	Y
B-419-024	1	Plutonium 238	0.268	pCi/g	0.0355	2.95	
B-419-024	1	Plutonium 239+240	2.52	pCi/g	0.046	2.58	
B-419-024	1	Tritium	14.2	pCi/g	0.106	110	
B-419-024	2.5	Tritium	11.6	pCi/g	0.106	110	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-024	5	Tritium	5.99	pCi/g	0.106	110	
B-419-024	10	Tritium	0.7	pCi/g	0.106	110	
B-419-024	15	Tritium	0.391	pCi/g	0.106	110	
B-419-024	1	Uranium 234 and Uranium 233	1.26	pCi/g	0.76	3.86	
B-419-024	1	Uranium 238	0.89	pCi/g	0.717	4.48	
B-419-024A	12	PCB 1254	0.042	mg/kg	-	0.22	
B-419-024A	12	Tritium	4.01	pCi/g	0.106	110	
B-419-025	11	Bis(2-ethylhexyl)phthalate	0.8	mg/kg	-	35	
B-419-025	3	Mercury	0.1	mg/kg	0.0759	10	
B-419-025	11	Mercury	0.1	mg/kg	0.0759	10	
B-419-025	3	Tritium	1.06	pCi/g	0.106	110	
B-419-025	3	Tritium	1.24	pCi/g	0.106	110	
B-419-025	6	Tritium	0.97	pCi/g	0.106	110	
B-419-026	6	Arsenic	10	mg/kg	7.59	11	
B-419-026	11	Mercury	0.091	mg/kg	0.0759	10	
B-419-027	1	Lead	27	mg/kg	14.3	400	
B-419-027	1	Mercury	0.093	mg/kg	0.0759	10	
B-419-027	6	Mercury	0.1	mg/kg	0.0759	10	
B-419-027	11	Mercury	0.088	mg/kg	0.0759	10	
B-419-028	1	Chromium	52	mg/kg	48.9	48.9	Y
B-419-028	1	Chromium	69	mg/kg	48.9	48.9	Y
B-419-028	3	Chromium	70	mg/kg	48.9	48.9	Y
B-419-028	11	Mercury	0.097	mg/kg	0.0759	10	
B-419-028	1	Nickel	140	mg/kg	70.1	1500	
B-419-028	3	Nickel	120	mg/kg	70.1	1500	
B-419-028	1	PCB 1254	0.25	mg/kg	-	0.22	Y
B-419-028	3	Tritium	0.283	pCi/g	0.106	110	
B-419-028	3	Tritium	0.37	pCi/g	0.106	110	
B-419-028	6	Tritium	4.78	pCi/g	0.106	110	
B-419-028	11	Tritium	2.56	pCi/g	0.106	110	
B-419-029	1	Chromium	100	mg/kg	48.9	48.9	Y
B-419-029	11	Mercury	0.082	mg/kg	0.0759	10	
B-419-030	6	Arsenic	9.2	mg/kg	7.59	11	
B-419-030	1	Chromium	110	mg/kg	48.9	48.9	Y
B-419-030	3	Chromium	71	mg/kg	48.9	48.9	Y
B-419-030	6	Chromium	59	mg/kg	48.9	48.9	Y
B-419-030	3	Mercury	0.21	mg/kg	0.0759	10	
B-419-030	6	Mercury	0.089	mg/kg	0.0759	10	
B-419-030	11	Mercury	0.086	mg/kg	0.0759	10	
B-419-030	11	Tritium	0.77	pCi/g	0.106	110	
B-419-031	5	Mercury	0.099	mg/kg	0.0759	10	
B-419-031	15	Mercury	0.11	mg/kg	0.0759	10	
B-419-031	1	Zinc	76	mg/kg	69.8	23000	
B-419-032	0.8	Mercury	0.083	mg/kg	0.0759	10	
B-419-032	0.8	Methylene chloride	0.0063	mg/kg	-	11	
B-419-032	10	Nickel	100	mg/kg	70.1	1500	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-032	0.8	Tritium	0.5	pCi/g	0.106	110	
B-419-032	5	Tritium	0.92	pCi/g	0.106	110	
B-419-032	15	Tritium	0.225	pCi/g	0.106	110	
B-419-032A	2	Tritium	0.37	pCi/g	0.106	110	
B-419-033	1.6	Cobalt	19	mg/kg	16.7	660	
B-419-033	2	Cobalt	21	mg/kg	16.7	660	
B-419-033	1.6	Tritium	0.338	pCi/g	0.106	110	
B-419-033	2	Tritium	0.313	pCi/g	0.106	110	
B-419-034	2	Chromium	54	mg/kg	48.9	48.9	Y
B-419-034	5	Mercury	0.099	mg/kg	0.0759	10	
B-419-034	2	Nickel	110	mg/kg	70.1	1500	
B-419-034	1	Tetrachloroethene	0.0056	mg/kg	-	0.55	
B-419-034	2	Tetrachloroethene	0.0054	mg/kg	-	0.55	
B-419-034	2	Tritium	0.278	pCi/g	0.106	110	
B-419-034	2.8	Tritium	0.41	pCi/g	0.106	110	
B-419-034	5	Tritium	1.44	pCi/g	0.106	110	
B-419-034	10	Tritium	1.8	pCi/g	0.106	110	
B-419-034	15	Tritium	1.87	pCi/g	0.106	110	
B-419-035	1	Cadmium	0.73	mg/kg	0.55	70	
B-419-035	1	Chromium	54	mg/kg	48.9	48.9	Y
B-419-035	3	Chromium	52	mg/kg	48.9	48.9	Y
B-419-035	1	Mercury	0.19	mg/kg	0.0759	10	
B-419-035	6	Mercury	0.085	mg/kg	0.0759	10	
B-419-035	11	Mercury	0.11	mg/kg	0.0759	10	
B-419-035	1	Nickel	140	mg/kg	70.1	1500	
B-419-035	3	Nickel	110	mg/kg	70.1	1500	
B-419-035	3	Tetrachloroethene	0.0044	mg/kg	-	0.55	
B-419-035	1	Tritium	0.213	pCi/g	0.106	110	
B-419-036	1	Mercury	0.43	mg/kg	0.0759	10	
B-419-036	11	Mercury	0.1	mg/kg	0.0759	10	
B-419-036	1	Nickel	87	mg/kg	70.1	1500	
B-419-036	1	PCB 1254	0.12	mg/kg	-	0.22	
B-419-036	11	Selenium	0.57	mg/kg	0.55	390	
B-419-036	3	Tritium	0.305	pCi/g	0.106	110	
B-419-036	16	Tritium	0.89	pCi/g	0.106	110	
B-419-037	1	Antimony	2.9	mg/kg	2.2	31	
B-419-037	1	Cadmium	0.61	mg/kg	0.55	70	
B-419-037	1	Copper	170	mg/kg	35.8	3100	
B-419-037	1	Lead	19	mg/kg	14.3	400	
B-419-037	1	Mercury	17	mg/kg	0.0759	10	Y
B-419-037	1	Mercury	12	mg/kg	0.0759	10	Y
B-419-037	3	Mercury	0.2	mg/kg	0.0759	10	
B-419-037	3	Mercury	0.21	mg/kg	0.0759	10	
B-419-037	6	Mercury	0.13	mg/kg	0.0759	10	
B-419-037	11	Mercury	0.084	mg/kg	0.0759	10	
B-419-037	1	Molybdenum	5	mg/kg	1.1	390	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-037	1	Molybdenum	1.5	mg/kg	1.1	390	
B-419-037	1	Nickel	110	mg/kg	70.1	1500	
B-419-037	1	PCB 1254	0.11	mg/kg	-	0.22	
B-419-037	1	PCB 1254	0.11	mg/kg	-	0.22	
B-419-037	1	Tritium	0.216	pCi/g	0.106	110	
B-419-037	3	Tritium	4.16	pCi/g	0.106	110	
B-419-037	3	Tritium	3.53	pCi/g	0.106	110	
B-419-037	6	Tritium	7.8	pCi/g	0.106	110	
B-419-037	11	Tritium	7.4	pCi/g	0.106	110	
B-419-038	2	Americium 241	150	pCi/g	0.062	1.8	Y
B-419-038	2	Americium 241	132	pCi/g	0.062	1.8	Y
B-419-038	1	Beryllium	0.69	mg/kg	0.55	160	
B-419-038	2	Beryllium	29	mg/kg	0.55	160	
B-419-038	2.5	Beryllium	40	mg/kg	0.55	160	
B-419-038	5	Beryllium	4.8	mg/kg	0.55	160	
B-419-038	9	Beryllium	8.2	mg/kg	0.55	160	
B-419-038	2	Cadmium	2.1	mg/kg	0.55	70	
B-419-038	2.5	Cadmium	4	mg/kg	0.55	70	
B-419-038	5	Cadmium	0.82	mg/kg	0.55	70	
B-419-038	9	Cadmium	1	mg/kg	0.55	70	
B-419-038	2	Cesium 137	1.08	pCi/g	0.16	4.02	
B-419-038	2	Chromium	280	mg/kg	48.9	48.9	Y
B-419-038	2.5	Chromium	300	mg/kg	48.9	48.9	Y
B-419-038	5	Chromium	52	mg/kg	48.9	48.9	Y
B-419-038	9	Chromium	95	mg/kg	48.9	48.9	Y
B-419-038	2	Cobalt 56	1.12	pCi/g	0.428	0.651	Y
B-419-038	2	Copper	110	mg/kg	35.8	3100	
B-419-038	2.5	Copper	200	mg/kg	35.8	3100	
B-419-038	5	Copper	36	mg/kg	35.8	3100	
B-419-038	9	Copper	64	mg/kg	35.8	3100	
B-419-038	2	Curium 242	0.24	pCi/g	0.0143	320	
B-419-038	1	Gross alpha	5.6	pCi/g	3.38	3.38	Y
B-419-038	2	Gross alpha	262	pCi/g	3.38	3.38	Y
B-419-038	2.5	Gross alpha	156	pCi/g	3.38	3.38	Y
B-419-038	5	Gross alpha	75	pCi/g	3.38	3.38	Y
B-419-038	9	Gross alpha	68	pCi/g	3.38	3.38	Y
B-419-038	15	Gross alpha	6.4	pCi/g	3.38	3.38	Y
B-419-038	2	Gross beta	9.8	pCi/g	4.47	4.47	Y
B-419-038	2.5	Gross beta	6.6	pCi/g	4.47	4.47	Y
B-419-038	9	Gross beta	5.3	pCi/g	4.47	4.47	Y
B-419-038	2	Hexavalent Chromium	8.3	mg/kg	2.2	2.2	Y
B-419-038	2.5	Hexavalent Chromium	12	mg/kg	2.2	2.2	Y
B-419-038	9	Hexavalent Chromium	4.5	mg/kg	2.2	2.2	Y
B-419-038	1	Lead	220	mg/kg	14.3	400	
B-419-038	2	Lead	230	mg/kg	14.3	400	
B-419-038	2.5	Lead	230	mg/kg	14.3	400	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-038	5	Lead	60	mg/kg	14.3	400	
B-419-038	9	Lead	130	mg/kg	14.3	400	
B-419-038	1	Mercury	0.65	mg/kg	0.0759	10	
B-419-038	2	Mercury	66	mg/kg	0.0759	10	Y
B-419-038	2.5	Mercury	15	mg/kg	0.0759	10	Y
B-419-038	5	Mercury	8.8	mg/kg	0.0759	10	
B-419-038	9	Mercury	25	mg/kg	0.0759	10	Y
B-419-038	15	Mercury	0.19	mg/kg	0.0759	10	
B-419-038	2.5	Nickel	91	mg/kg	70.1	1500	
B-419-038	1	PCB 1248	0.13	mg/kg	-	0.22	
B-419-038	2	PCB 1254	2	mg/kg	-	0.22	Y
B-419-038	2.5	PCB 1254	0.99	mg/kg	-	0.22	Y
B-419-038	5	PCB 1254	0.23	mg/kg	-	0.22	Y
B-419-038	9	PCB 1254	0.51	mg/kg	-	0.22	Y
B-419-038	2	Plutonium 238	1.07	pCi/g	0.0355	2.95	
B-419-038	2	Plutonium 239+240	32.2	pCi/g	0.046	2.58	Y
B-419-038	2	Silver	1.8	mg/kg	1.1	390	
B-419-038	2.5	Silver	1.2	mg/kg	1.1	390	
B-419-038	2	Strontium 90	1.15	pCi/g	0.264	0.344	Y
B-419-038	9	Tetrachloroethene	0.004	mg/kg	-	0.55	
B-419-038	1	Tritium	390	pCi/g	0.106	110	Y
B-419-038	2	Tritium	192	pCi/g	0.106	110	Y
B-419-038	2.5	Tritium	243	pCi/g	0.106	110	Y
B-419-038	5	Tritium	323	pCi/g	0.106	110	Y
B-419-038	9	Tritium	240	pCi/g	0.106	110	Y
B-419-038	15	Tritium	1360	pCi/g	0.106	110	Y
B-419-038	2	Uranium 234 and Uranium 233	2.7	pCi/g	0.76	3.86	
B-419-038	2	Uranium 235 and Uranium 236	0.129	pCi/g	0.0904	0.192	
B-419-038	2	Uranium 238	1.45	pCi/g	0.717	4.48	
B-419-038	2	Zinc	130	mg/kg	69.8	23000	
B-419-038	2.5	Zinc	170	mg/kg	69.8	23000	
B-419-038	9	Zinc	71	mg/kg	69.8	23000	
B-419-039	1	Chromium	53	mg/kg	48.9	48.9	Y
B-419-039	3	Chromium	150	mg/kg	48.9	48.9	Y
B-419-039	3	Cobalt	30	mg/kg	16.7	660	
B-419-039	1	Mercury	2.8	mg/kg	0.0759	10	
B-419-039	3	Mercury	0.21	mg/kg	0.0759	10	
B-419-039	1	Nickel	160	mg/kg	70.1	1500	
B-419-039	3	Nickel	430	mg/kg	70.1	1500	
B-419-039	1	PCB 1254	0.22	mg/kg	-	0.22	
B-419-039	11	Tritium	0.422	pCi/g	0.106	110	
B-419-040	105	1,1-Dichloroethene	0.012	mg/kg	-	240	
B-419-040	70	1,2-Dichloroethane	0.015	mg/kg	-	0.43	
B-419-040	75	1,2-Dichloroethane	0.0086	mg/kg	-	0.43	
B-419-040	80	1,2-Dichloroethane	0.031	mg/kg	-	0.43	
B-419-040	85	1,2-Dichloroethane	0.062	mg/kg	-	0.43	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-040	85	1,2-Dichloroethane	0.067	mg/kg	-	0.43	
B-419-040	90	1,2-Dichloroethane	0.061	mg/kg	-	0.43	
B-419-040	95	1,2-Dichloroethane	0.023	mg/kg	-	0.43	
B-419-040	30	Barium	350	mg/kg	332	15000	
B-419-040	40	Beryllium	0.56	mg/kg	0.55	160	
B-419-040	70	Beryllium	0.6	mg/kg	0.55	160	
B-419-040	85	Beryllium	0.62	mg/kg	0.55	160	
B-419-040	85	Beryllium	0.61	mg/kg	0.55	160	
B-419-040	95	Carbon tetrachloride	0.0052	mg/kg	-	0.61	
B-419-040	105	Carbon tetrachloride	0.0043	mg/kg	-	0.61	
B-419-040	75	Chromium	51	mg/kg	48.9	48.9	Y
B-419-040	105	Chromium	73	mg/kg	48.9	48.9	Y
B-419-040	105	Cobalt	29	mg/kg	16.7	660	
B-419-040	5	Mercury	0.092	mg/kg	0.0759	10	
B-419-040	10	Mercury	0.092	mg/kg	0.0759	10	
B-419-040	15	Mercury	0.1	mg/kg	0.0759	10	
B-419-040	30	Mercury	0.085	mg/kg	0.0759	10	
B-419-040	50	Mercury	0.084	mg/kg	0.0759	10	
B-419-040	15	Methylene chloride	0.015	mg/kg	-	11	
B-419-040	105	Nickel	170	mg/kg	70.1	1500	
B-419-040	15	Selenium	0.61	mg/kg	0.55	390	
B-419-040	85	Tetrachloroethene	0.0051	mg/kg	-	0.55	
B-419-040	95	Tetrachloroethene	0.0093	mg/kg	-	0.55	
B-419-040	105	Tetrachloroethene	0.0049	mg/kg	-	0.55	
B-419-040	50	Trichloroethene	0.0049	mg/kg	-	0.91	
B-419-040	70	Trichloroethene	0.0058	mg/kg	-	0.91	
B-419-040	80	Trichloroethene	0.017	mg/kg	-	0.91	
B-419-040	85	Trichloroethene	0.097	mg/kg	-	0.91	
B-419-040	85	Trichloroethene	0.063	mg/kg	-	0.91	
B-419-040	90	Trichloroethene	0.067	mg/kg	-	0.91	
B-419-040	95	Trichloroethene	0.28	mg/kg	-	0.91	
B-419-040	100	Trichloroethene	0.19	mg/kg	-	0.91	
B-419-040	105	Trichloroethene	0.16	mg/kg	-	0.91	
B-419-040	5	Tritium	18.2	pCi/g	0.106	110	
B-419-040	10	Tritium	4.47	pCi/g	0.106	110	
B-419-040	15	Tritium	23.8	pCi/g	0.106	110	
B-419-040	20	Tritium	67.3	pCi/g	0.106	110	
B-419-040	25	Tritium	14	pCi/g	0.106	110	
B-419-040	30	Tritium	12.7	pCi/g	0.106	110	
B-419-040	35	Tritium	79	pCi/g	0.106	110	
B-419-040	40	Tritium	62.6	pCi/g	0.106	110	
B-419-040	45	Tritium	50.8	pCi/g	0.106	110	
B-419-040	50	Tritium	41.7	pCi/g	0.106	110	
B-419-040	55	Tritium	60.1	pCi/g	0.106	110	
B-419-040	60	Tritium	53.5	pCi/g	0.106	110	
B-419-040	65	Tritium	41.1	pCi/g	0.106	110	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-040	70	Tritium	54	pCi/g	0.106	110	
B-419-040	75	Tritium	13.4	pCi/g	0.106	110	
B-419-040	80	Tritium	27.1	pCi/g	0.106	110	
B-419-040	85	Tritium	5.82	pCi/g	0.106	110	
B-419-040	85	Tritium	13.5	pCi/g	0.106	110	
B-419-040	90	Tritium	28	pCi/g	0.106	110	
B-419-040	95	Tritium	8.9	pCi/g	0.106	110	
B-419-040	100	Tritium	0.53	pCi/g	0.106	110	
B-419-040	105	Vanadium	46	mg/kg	43.7	390	
B-419-041	100	1,1-Dichloroethene	0.018	mg/kg	-	240	
B-419-041	75	1,2-Dichloroethane	0.01	mg/kg	-	0.43	
B-419-041	80	1,2-Dichloroethane	0.017	mg/kg	-	0.43	
B-419-041	80	1,2-Dichloroethane	0.026	mg/kg	-	0.43	
B-419-041	85	1,2-Dichloroethane	0.021	mg/kg	-	0.43	
B-419-041	90	1,2-Dichloroethane	0.016	mg/kg	-	0.43	
B-419-041	95	1,2-Dichloroethane	0.007	mg/kg	-	0.43	
B-419-041	75	Acetone	0.018	mg/kg	-	61000	
B-419-041	35	Beryllium	0.61	mg/kg	0.55	160	
B-419-041	85	Beryllium	0.58	mg/kg	0.55	160	
B-419-041	100	Carbon tetrachloride	0.009	mg/kg	-	0.61	
B-419-041	15	Chromium	72	mg/kg	48.9	48.9	Y
B-419-041	10	Mercury	0.11	mg/kg	0.0759	10	
B-419-041	20	Mercury	0.077	mg/kg	0.0759	10	
B-419-041	20	Mercury	0.082	mg/kg	0.0759	10	
B-419-041	45	Mercury	0.13	mg/kg	0.0759	10	
B-419-041	100	Tetrachloroethene	0.0095	mg/kg	-	0.55	
B-419-041	75	Trichloroethene	0.0063	mg/kg	-	0.91	
B-419-041	80	Trichloroethene	0.012	mg/kg	-	0.91	
B-419-041	80	Trichloroethene	0.019	mg/kg	-	0.91	
B-419-041	85	Trichloroethene	0.023	mg/kg	-	0.91	
B-419-041	90	Trichloroethene	0.022	mg/kg	-	0.91	
B-419-041	95	Trichloroethene	0.076	mg/kg	-	0.91	
B-419-041	100	Trichloroethene	0.43	mg/kg	-	0.91	
B-419-041	5	Tritium	19.8	pCi/g	0.106	110	
B-419-041	10	Tritium	19.9	pCi/g	0.106	110	
B-419-041	15	Tritium	116	pCi/g	0.106	110	Y
B-419-041	20	Tritium	1910	pCi/g	0.106	110	Y
B-419-041	20	Tritium	990	pCi/g	0.106	110	Y
B-419-041	25	Tritium	359	pCi/g	0.106	110	Y
B-419-041	30	Tritium	890	pCi/g	0.106	110	Y
B-419-041	35	Tritium	990	pCi/g	0.106	110	Y
B-419-041	40	Tritium	468	pCi/g	0.106	110	Y
B-419-041	45	Tritium	277	pCi/g	0.106	110	Y
B-419-041	50	Tritium	311	pCi/g	0.106	110	Y
B-419-041	55	Tritium	220	pCi/g	0.106	110	Y
B-419-041	60	Tritium	117	pCi/g	0.106	110	Y

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-041	65	Tritium	57.2	pCi/g	0.106	110	
B-419-041	70	Tritium	102	pCi/g	0.106	110	
B-419-041	75	Tritium	40.5	pCi/g	0.106	110	
B-419-041	80	Tritium	40.4	pCi/g	0.106	110	
B-419-041	80	Tritium	62.8	pCi/g	0.106	110	
B-419-041	85	Tritium	19.6	pCi/g	0.106	110	
B-419-041	90	Tritium	34.2	pCi/g	0.106	110	
B-419-041	95	Tritium	4.53	pCi/g	0.106	110	
B-419-041	100	Tritium	1.02	pCi/g	0.106	110	
B-419-042A	1	Acetone	0.023	mg/kg	-	61000	
B-419-042A	1	Barium	460	mg/kg	332	15000	
B-419-042A	1	Beryllium	2.8	mg/kg	0.55	160	
B-419-042A	1	Cadmium	2.6	mg/kg	0.55	70	
B-419-042A	1	Cobalt	130	mg/kg	16.7	660	
B-419-042A	1	Lead	80	mg/kg	14.3	400	
B-419-042A	1	Mercury	6.8	mg/kg	0.0759	10	
B-419-042A	1	PCB 1254	3.2	mg/kg	-	0.22	Y
B-419-042A	1	Silver	9	mg/kg	1.1	390	
B-419-042A	1	Tritium	4.16	pCi/g	0.106	110	
B-419-042A	1	Zinc	180	mg/kg	69.8	23000	
B-419-042B	1	Acetone	0.04	mg/kg	-	61000	
B-419-042B	1	Beryllium	3.9	mg/kg	0.55	160	
B-419-042B	1	Cadmium	0.68	mg/kg	0.55	70	
B-419-042B	1	Cobalt	170	mg/kg	16.7	660	
B-419-042B	1	Lead	140	mg/kg	14.3	400	
B-419-042B	1	Mercury	0.74	mg/kg	0.0759	10	
B-419-042B	1	PCB 1254	5	mg/kg	-	0.22	Y
B-419-042B	1	Silver	2.7	mg/kg	1.1	390	
B-419-042B	1	Tritium	0.63	pCi/g	0.106	110	
B-419-042B	1	Zinc	120	mg/kg	69.8	23000	
B-419-043	1	Antimony	2.9	mg/kg	2.2	31	
B-419-043	1	Benzo(a)anthracene	0.37	mg/kg	-	4	
B-419-043	1	Benzo(b)fluoranthene	0.42	mg/kg	-	4	
B-419-043	1	Chrysene	0.41	mg/kg	-	15	
B-419-043	1	Cobalt	50	mg/kg	16.7	660	
B-419-043	1	Copper	67	mg/kg	35.8	3100	
B-419-043	1	Fluoranthene	0.84	mg/kg	-	2300	
B-419-043	1	Lead	34	mg/kg	14.3	400	
B-419-043	1	Molybdenum	7	mg/kg	1.1	390	
B-419-043	1	Phenanthrene	0.77	mg/kg	-	4	
B-419-043	1	Pyrene	0.74	mg/kg	-	1700	
B-419-043	1	Zinc	97	mg/kg	69.8	23000	
B-419-044	1	Cobalt	94	mg/kg	16.7	660	
B-419-044	1	Lead	25	mg/kg	14.3	400	
B-419-044	1	Mercury	1.7	mg/kg	0.0759	10	
B-419-044	1	Silver	1.2	mg/kg	1.1	390	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-045	1	Cadmium	1.1	mg/kg	0.55	70	
B-419-045	1	Cobalt	150	mg/kg	16.7	660	
B-419-045	1	Silver	4.7	mg/kg	1.1	390	
B-419-046	1	Beryllium	2.3	mg/kg	0.55	160	
B-419-046	10	Beryllium	2.1	mg/kg	0.55	160	
B-419-046	10	Cadmium	1.2	mg/kg	0.55	70	
B-419-046	10	Copper	41	mg/kg	35.8	3100	
B-419-046	1	Gross alpha	18.7	pCi/g	3.38	3.38	Y
B-419-046	5	Gross alpha	5.5	pCi/g	3.38	3.38	Y
B-419-046	10	Gross alpha	17.4	pCi/g	3.38	3.38	Y
B-419-046	1	Gross beta	6.6	pCi/g	4.47	4.47	Y
B-419-046	1	Lead	210	mg/kg	14.3	400	
B-419-046	5	Lead	50	mg/kg	14.3	400	
B-419-046	10	Lead	330	mg/kg	14.3	400	
B-419-046	1	Mercury	1.2	mg/kg	0.0759	10	
B-419-046	5	Mercury	0.99	mg/kg	0.0759	10	
B-419-046	10	Mercury	3.6	mg/kg	0.0759	10	
B-419-046	15	Mercury	0.32	mg/kg	0.0759	10	
B-419-046	1	PCB 1254	0.097	mg/kg	-	0.22	
B-419-046	10	PCB 1254	0.06	mg/kg	-	0.22	
B-419-046	15	PCB 1254	0.046	mg/kg	-	0.22	
B-419-046	1	Tritium	232	pCi/g	0.106	110	Y
B-419-046	5	Tritium	367	pCi/g	0.106	110	Y
B-419-046	10	Tritium	740	pCi/g	0.106	110	Y
B-419-046	15	Tritium	291	pCi/g	0.106	110	Y
B-419-047	1	Acetone	0.029	mg/kg	-	61000	
B-419-047	1	Mercury	0.3	mg/kg	0.0759	10	
B-419-047	5	Mercury	0.21	mg/kg	0.0759	10	
B-419-047	1	PCB 1254	0.038	mg/kg	-	0.22	
B-419-047	5	Selenium	0.56	mg/kg	0.55	390	
B-419-047	1	Tritium	97	pCi/g	0.106	110	
B-419-047	5	Tritium	98	pCi/g	0.106	110	
B-419-047	10	Tritium	14.7	pCi/g	0.106	110	
B-419-047	15	Tritium	17.7	pCi/g	0.106	110	
B-419-048	1	Acetone	0.43	mg/kg	-	61000	
B-419-048	5	Beryllium	0.57	mg/kg	0.55	160	
B-419-048	10	Beryllium	0.62	mg/kg	0.55	160	
B-419-048	10	Chromium	52	mg/kg	48.9	48.9	Y
B-419-048	15	Chromium	55	mg/kg	48.9	48.9	Y
B-419-048	5	Gross alpha	3.5	pCi/g	3.38	3.38	Y
B-419-048	10	Gross alpha	3.6	pCi/g	3.38	3.38	Y
B-419-048	5	Lead	16	mg/kg	14.3	400	
B-419-048	1	Mercury	0.095	mg/kg	0.0759	10	
B-419-048	5	Mercury	0.41	mg/kg	0.0759	10	
B-419-048	10	Mercury	0.8	mg/kg	0.0759	10	
B-419-048	15	Mercury	0.29	mg/kg	0.0759	10	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-048	5	PCB 1254	0.096	mg/kg	-	0.22	
B-419-048	10	PCB 1254	0.1	mg/kg	-	0.22	
B-419-048	15	PCB 1254	0.19	mg/kg	-	0.22	
B-419-048	5	Tetrachloroethene	0.0072	mg/kg	-	0.55	
B-419-048	1	Tritium	242	pCi/g	0.106	110	Y
B-419-048	5	Tritium	1420	pCi/g	0.106	110	Y
B-419-048	10	Tritium	1380	pCi/g	0.106	110	Y
B-419-048	15	Tritium	427	pCi/g	0.106	110	Y
B-419-049	1	Gross alpha	3.5	pCi/g	3.38	3.38	Y
B-419-049	1	Hexavalent Chromium	3.2	mg/kg	2.2	2.2	Y
B-419-049	1	Mercury	0.27	mg/kg	0.0759	10	
B-419-049	5	Mercury	0.25	mg/kg	0.0759	10	
B-419-049	10	Mercury	0.27	mg/kg	0.0759	10	
B-419-049	5	PCB 1254	0.081	mg/kg	-	0.22	
B-419-049	10	PCB 1254	0.074	mg/kg	-	0.22	
B-419-049	1	Tritium	1180	pCi/g	0.106	110	Y
B-419-049	5	Tritium	1680	pCi/g	0.106	110	Y
B-419-049	10	Tritium	1740	pCi/g	0.106	110	Y
B-419-049	15	Tritium	1440	pCi/g	0.106	110	Y
B-419-050	1	Beryllium	1.3	mg/kg	0.55	160	
B-419-050	1.5	Beryllium	1.7	mg/kg	0.55	160	
B-419-050	1	Gross alpha	3.6	pCi/g	3.38	3.38	Y
B-419-050	5	Gross alpha	4	pCi/g	3.38	3.38	Y
B-419-050	1	Lead	150	mg/kg	14.3	400	
B-419-050	1.5	Lead	300	mg/kg	14.3	400	
B-419-050	1	Mercury	13	mg/kg	0.0759	10	Y
B-419-050	1.5	Mercury	22	mg/kg	0.0759	10	Y
B-419-050	5	Mercury	0.17	mg/kg	0.0759	10	
B-419-050	10	Mercury	0.2	mg/kg	0.0759	10	
B-419-050	14.5	Mercury	0.09	mg/kg	0.0759	10	
B-419-050	1	PCB 1248	0.28	mg/kg	-	0.22	Y
B-419-050	1.5	PCB 1248	0.26	mg/kg	-	0.22	Y
B-419-050	1	Tritium	1330	pCi/g	0.106	110	Y
B-419-050	1.5	Tritium	451	pCi/g	0.106	110	Y
B-419-050	5	Tritium	1130	pCi/g	0.106	110	Y
B-419-050	10	Tritium	1430	pCi/g	0.106	110	Y
B-419-050	14.5	Tritium	1350	pCi/g	0.106	110	Y
B-419-051	5	Mercury	0.17	mg/kg	0.0759	10	
B-419-051	10	Mercury	0.11	mg/kg	0.0759	10	
B-419-051	15	Mercury	0.087	mg/kg	0.0759	10	
B-419-051	1	Tetrachloroethene	0.0044	mg/kg	-	0.55	
B-419-051	1	Tritium	9.4	pCi/g	0.106	110	
B-419-051	5	Tritium	99	pCi/g	0.106	110	
B-419-051	10	Tritium	17.7	pCi/g	0.106	110	
B-419-051	15	Tritium	5.33	pCi/g	0.106	110	
B-419-101	7	Mercury	0.093	mg/kg	0.0759	10	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-101	10	Mercury	0.39	mg/kg	0.0759	10	
B-419-101	7	Tritium	228	pCi/g	0.106	110	Y
B-419-101	10	Tritium	1130	pCi/g	0.106	110	Y
B-419-102	1	Mercury	0.096	mg/kg	0.0759	10	
B-419-103	10	Mercury	0.19	mg/kg	0.0759	10	
B-419-103	25	Trichloroethene	0.011	mg/kg	-	0.91	
B-419-103	7	Tritium	0.207	pCi/g	0.106	110	
B-419-103	10	Tritium	1.8	pCi/g	0.106	110	
B-419-104	7	Mercury	0.1	mg/kg	0.0759	10	
B-419-104	10	Mercury	0.086	mg/kg	0.0759	10	
B-419-104	7	Tritium	0.74	pCi/g	0.106	110	
B-419-104	10	Tritium	0.89	pCi/g	0.106	110	
B-419-105	25	Bis(2-ethylhexyl)phthalate	0.42	mg/kg	-	35	
B-419-106	7	Mercury	0.084	mg/kg	0.0759	10	
B-419-R124-001	3	Acetone	0.1	mg/kg	-	61000	
B-419-R124-001	5	Acetone	0.02	mg/kg	-	61000	
B-419-R124-001	3	Americium 241	0.159	pCi/g	0.062	1.8	
B-419-R124-001	3	Beryllium	0.76	mg/kg	0.55	160	
B-419-R124-001	3	Gross alpha	21.2	pCi/g	3.38	3.38	Y
B-419-R124-001	3	Gross beta	28.1	pCi/g	4.47	4.47	Y
B-419-R124-001	3	Mercury	4.3	mg/kg	0.0759	10	
B-419-R124-001	5	Mercury	0.14	mg/kg	0.0759	10	
B-419-R124-001	3	Molybdenum	2.1	mg/kg	1.1	390	
B-419-R124-001	3	Plutonium 239+240	0.64	pCi/g	0.046	2.58	
B-419-R124-001	3	Thorium 234	30	pCi/g	2.44	1270	
B-419-R124-001	3	Tritium	2.2	pCi/g	0.106	110	
B-419-R124-001	5	Tritium	0.482	pCi/g	0.106	110	
B-419-R124-001	10	Tritium	0.69	pCi/g	0.106	110	
B-419-R124-001	3	Uranium 234 and Uranium 233	18.4	pCi/g	0.76	3.86	Y
B-419-R124-001	3	Uranium 235 and Uranium 236	1.39	pCi/g	0.0904	0.192	Y
B-419-R124-001	3	Uranium 238	46	pCi/g	0.717	4.48	Y
B-419-R124-002	3.5	Acetone	0.053	mg/kg	-	61000	
B-419-R124-002	5	Acetone	0.041	mg/kg	-	61000	
B-419-R124-002	3.5	Lead	29	mg/kg	14.3	400	
B-419-R124-002	3.5	Tritium	0.57	pCi/g	0.106	110	
B-419-R124-002	5	Tritium	0.208	pCi/g	0.106	110	
B-419-R124-002	10	Tritium	0.65	pCi/g	0.106	110	
B-419-R124-002	15	Tritium	0.229	pCi/g	0.106	110	
B-419-R124-003	3	Chromium	110	mg/kg	48.9	48.9	Y
B-419-R124-003	5	Copper	52	mg/kg	35.8	3100	
B-419-R124-003	3	Nickel	160	mg/kg	70.1	1500	
B-419-R124-003	15	Tritium	0.259	pCi/g	0.106	110	
B-419-R124-004	5	Acetone	0.086	mg/kg	-	61000	
B-419-R124-004	3	Lead	120	mg/kg	14.3	400	
B-419-R124-004	3	Mercury	0.14	mg/kg	0.0759	10	
B-419-R124-004	5	Tritium	1.69	pCi/g	0.106	110	

Sample Location	Depth (Feet)	Analyte	Result	Unit	Site Background Level	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-R124-004	10	Tritium	1.11	pCi/g	0.106	110	
B-419-R124-004	15	Tritium	0.208	pCi/g	0.106	110	

Appendix K

Concrete and Asphalt Sample Results

Composite Area	Sample Location	Analyte	Result	Units
Area1	B-419-COMP-001	Chromium	35	mg/kg
Area1	B-419-COMP-001	Hexavalent Chromium	3.4	mg/kg
Area1	B-419-COMP-001	Cobalt	8.3	mg/kg
Area1	B-419-COMP-001	Copper	39	mg/kg
Area1	B-419-COMP-001	Diesel Fuel	12	mg/kg
Area1	B-419-COMP-001	Lead	5.9	mg/kg
Area1	B-419-COMP-001	Mercury	0.061	mg/kg
Area1	B-419-COMP-001	Methylene chloride	78	ug/L*
Area1	B-419-COMP-001	Nickel	46	mg/kg
Area1	B-419-COMP-001	PCB 1254	88	ug/kg
Area1	B-419-COMP-001	Tritium	25.1	pCi/g
Area1	B-419-COMP-001	Vanadium	32	mg/kg
Area1	B-419-COMP-001	Zinc	57	mg/kg
Area1	B-419-COMP-001	Arsenic	5.8	mg/kg
Area1	B-419-COMP-001	Barium	150	mg/kg
Area2	B-419-COMP-002	Chromium	34	mg/kg
Area2	B-419-COMP-002	Hexavalent Chromium	2.6	mg/kg
Area2	B-419-COMP-002	Cobalt	7.9	mg/kg
Area2	B-419-COMP-002	Copper	43	mg/kg
Area2	B-419-COMP-002	Nickel	43	mg/kg
Area2	B-419-COMP-002	Methylene chloride	120	ug/L*
Area2	B-419-COMP-002	Methylene chloride	6.7	ug/kg
Area2	B-419-COMP-002	Molybdenum	1.8	mg/kg
Area2	B-419-COMP-002	Lead	4.3	mg/kg
Area2	B-419-COMP-002	Zinc	49	mg/kg
Area2	B-419-COMP-002	Acetone	21	ug/kg
Area2	B-419-COMP-002	Arsenic	3.6	mg/kg
Area2	B-419-COMP-002	Barium	160	mg/kg
Area2	B-419-COMP-002	Tritium	108	pCi/g
Area2	B-419-COMP-002	Vanadium	28	mg/kg
Area2	B-419-R167-001	Protactinium 234m	115	pCi/g
Area2	B-419-R167-001	Gross alpha	21.6	pCi/g
Area2	B-419-R167-001	Gross alpha	25.7	pCi/g
Area2	B-419-R167-001	Gross beta	58.4	pCi/g
Area2	B-419-R167-001	Gross beta	72	pCi/g
Area2	B-419-R167-001	Lead 214	0.68	pCi/g
Area2	B-419-R167-001	Cesium 137	10.7	pCi/g
Area2	B-419-R167-001	Cesium 137	14.3	pCi/g
Area2	B-419-R167-001	Curium 244	0.167	pCi/g

Composite Area	Sample Location	Analyte	Result	Units
Area2	B-419-R167-001	Americium 241	1.06	pCi/g
Area2	B-419-R167-001	Americium 241	2.8	pCi/g
Area2	B-419-R167-001	Americium 241	1.9	pCi/g
Area2	B-419-R167-001	Silver 110m	0.22	pCi/g
Area2	B-419-R167-001	Strontium 90	4.1	pCi/g
Area2	B-419-R167-001	Strontium 90	6.1	pCi/g
Area2	B-419-R167-001	Thorium 230	0.264	pCi/g
Area2	B-419-R167-001	Thorium 230	0.309	pCi/g
Area2	B-419-R167-001	Thorium 232	0.298	pCi/g
Area2	B-419-R167-001	Thorium 232	0.285	pCi/g
Area2	B-419-R167-001	Thorium 228	0.3	pCi/g
Area2	B-419-R167-001	Thorium 228	0.235	pCi/g
Area2	B-419-R167-001	Thorium 234	25.2	pCi/g
Area2	B-419-R167-001	Thorium 234	92	pCi/g
Area2	B-419-R167-001	Tritium	44.7	pCi/g
Area2	B-419-R167-001	Tritium	34.7	pCi/g
Area2	B-419-R167-001	Uranium 235	1.84	pCi/g
Area2	B-419-R167-001	Uranium 234 and Uranium 233	14.6	pCi/g
Area2	B-419-R167-001	Uranium 234 and Uranium 233	13.9	pCi/g
Area2	B-419-R167-001	Uranium 235 and Uranium 236	1.41	pCi/g
Area2	B-419-R167-001	Uranium 235 and Uranium 236	1.2	pCi/g
Area2	B-419-R167-001	Uranium 238	53.7	pCi/g
Area2	B-419-R167-001	Uranium 238	54.8	pCi/g
Area2	B-419-R167-001	Niobium 95	0.3	pCi/g
Area2	B-419-R167-001	Plutonium 238	0.209	pCi/g
Area2	B-419-R167-001	Plutonium 238	1.53	pCi/g
Area2	B-419-R167-001	Plutonium 239+240	3.08	pCi/g
Area2	B-419-R167-001	Plutonium 239+240	4.24	pCi/g
Area2	B-419-R167-001	Potassium 40	7.9	pCi/g
Area3	B-419-014	Zinc	0.58	mg/L*
Area3	B-419-014	Zinc	44	mg/kg
Area3	B-419-014	1,3,5-Trimethylbenzene	130	ug/kg
Area3	B-419-014	Arsenic	8.6	mg/kg
Area3	B-419-014	Barium	2.9	mg/L*
Area3	B-419-014	Barium	0.59	mg/L*
Area3	B-419-014	Tritium	0.382	pCi/g
Area3	B-419-014	Vanadium	0.16	mg/L*
Area3	B-419-014	Vanadium	31	mg/kg
Area3	B-419-014	1,2,4-Trimethylbenzene	17	ug/L*

Composite Area	Sample Location	Analyte	Result	Units
Area3	B-419-014	1,2,4-Trimethylbenzene	440	ug/kg
Area3	B-419-014	Barium	120	mg/kg
Area3	B-419-014	Molybdenum	0.34	mg/L*
Area3	B-419-014	Molybdenum	85	mg/kg
Area3	B-419-014	Naphthalene	12	ug/L*
Area3	B-419-014	Naphthalene	140	ug/kg
Area3	B-419-014	Methylene chloride	210	ug/L*
Area3	B-419-014	Nickel	0.69	mg/L*
Area3	B-419-014	Nickel	440	mg/kg
Area3	B-419-014	Selenium	12	mg/kg
Area3	B-419-014	Diesel Fuel	23	mg/kg
Area3	B-419-014	Gasoline fingerprint	3	mg/kg
Area3	B-419-014	Lead	0.065	mg/L*
Area3	B-419-014	Lead	15	mg/kg
Area3	B-419-014	Copper	1.4	mg/L*
Area3	B-419-014	Copper	180	mg/kg
Area3	B-419-014	Cobalt	0.11	mg/L*
Area3	B-419-014	Cobalt	15	mg/kg
Area3	B-419-014	Chromium	0.42	mg/L*
Area3	B-419-014	Chromium	760	mg/kg
Area3	B-419-COMP-003	Chromium	36	mg/kg
Area3	B-419-COMP-003	Hexavalent Chromium	4.8	mg/kg
Area3	B-419-COMP-003	Cobalt	7.8	mg/kg
Area3	B-419-COMP-003	Copper	53	mg/kg
Area3	B-419-COMP-003	Nickel	45	mg/kg
Area3	B-419-COMP-003	Methylene chloride	84	ug/L*
Area3	B-419-COMP-003	Molybdenum	4.2	mg/kg
Area3	B-419-COMP-003	Lead	5	mg/kg
Area3	B-419-COMP-003	Mercury	0.053	mg/kg
Area3	B-419-COMP-003	Gross beta	2.5	pCi/g
Area3	B-419-COMP-003	Diesel Fuel	6.3	mg/kg
Area3	B-419-COMP-003	Zinc	73	mg/kg
Area3	B-419-COMP-003	Arsenic	4.7	mg/kg
Area3	B-419-COMP-003	Barium	200	mg/kg
Area3	B-419-COMP-003	Tritium	0.429	pCi/g
Area3	B-419-COMP-003	Vanadium	43	mg/kg
Area4	B-419-021	Potassium 40	3.2	pCi/g
Area4	B-419-021	Thallium 208	0.28	pCi/g
Area4	B-419-021	Thorium 230	0.425	pCi/g

Composite Area	Sample Location	Analyte	Result	Units
Area4	B-419-021	Thorium 230	0.39	pCi/g
Area4	B-419-021	Thorium 232	0.286	pCi/g
Area4	B-419-021	Thorium 232	0.269	pCi/g
Area4	B-419-021	Thorium 228	0.16	pCi/g
Area4	B-419-021	Thorium 228	0.325	pCi/g
Area4	B-419-021	Tritium	18	pCi/g
Area4	B-419-021	Tritium	19.1	pCi/g
Area4	B-419-021	Uranium 234 and Uranium 233	0.31	pCi/g
Area4	B-419-021	Uranium 234 and Uranium 233	0.32	pCi/g
Area4	B-419-021	Uranium 238	0.37	pCi/g
Area4	B-419-021	Uranium 238	0.287	pCi/g
Area4	B-419-021	Bismuth 212	2	pCi/g
Area4	B-419-021	Lead 212	0.3	pCi/g
Area4	B-419-COMP-004	Zinc	35	mg/kg
Area4	B-419-COMP-004	Arsenic	3.4	mg/kg
Area4	B-419-COMP-004	Barium	100	mg/kg
Area4	B-419-COMP-004	Tritium	4.7	pCi/g
Area4	B-419-COMP-004	Vanadium	30	mg/kg
Area4	B-419-COMP-004	2,4,5-TP (Silvex)	0.00058	mg/L*
Area4	B-419-COMP-004	Nickel	40	mg/kg
Area4	B-419-COMP-004	Methylene chloride	82	ug/L*
Area4	B-419-COMP-004	Methylene chloride	6.4	ug/kg
Area4	B-419-COMP-004	Lead	5.3	mg/kg
Area4	B-419-COMP-004	Mercury	0.72	mg/kg
Area4	B-419-COMP-004	Chromium	30	mg/kg
Area4	B-419-COMP-004	Hexavalent Chromium	2.1	mg/kg
Area4	B-419-COMP-004	Cobalt	8.7	mg/kg
Area4	B-419-COMP-004	Copper	37	mg/kg
Area4	B-419-COMP-004A	Cobalt	6.7	mg/kg
Area4	B-419-COMP-004A	Copper	42	mg/kg
Area4	B-419-COMP-004A	Chromium	23	mg/kg
Area4	B-419-COMP-004A	Gross beta	2.67	pCi/g
Area4	B-419-COMP-004A	Methylene chloride	110	ug/L*
Area4	B-419-COMP-004A	Methylene chloride	9.1	ug/kg
Area4	B-419-COMP-004A	Lead	3.7	mg/kg
Area4	B-419-COMP-004A	Nickel	34	mg/kg
Area4	B-419-COMP-004A	Tritium	1.01	pCi/g
Area4	B-419-COMP-004A	Vanadium	17	mg/kg
Area4	B-419-COMP-004A	Zinc	33	mg/kg

Composite Area	Sample Location	Analyte	Result	Units
Area4	B-419-COMP-004A	Arsenic	2.7	mg/kg
Area4	B-419-COMP-004A	Barium	130	mg/kg
Area5	B-419-COMP-005	Vanadium	49	mg/kg
Area5	B-419-COMP-005	Zinc	55	mg/kg
Area5	B-419-COMP-005	Acetone	30	ug/kg
Area5	B-419-COMP-005	Arsenic	2.3	mg/kg
Area5	B-419-COMP-005	Barium	290	mg/kg
Area5	B-419-COMP-005	Methylene chloride	79	ug/L*
Area5	B-419-COMP-005	Methylene chloride	7	ug/kg
Area5	B-419-COMP-005	Lead	6.1	mg/kg
Area5	B-419-COMP-005	PCB 1254	55	ug/kg
Area5	B-419-COMP-005	Nickel	39	mg/kg
Area5	B-419-COMP-005	Tritium	24.3	pCi/g
Area5	B-419-COMP-005	Diesel Fuel	6	mg/kg
Area5	B-419-COMP-005	Gross alpha	2.67	pCi/g
Area5	B-419-COMP-005	Gross beta	2.16	pCi/g
Area5	B-419-COMP-005	Copper	47	mg/kg
Area5	B-419-COMP-005	Chromium	35	mg/kg
Area5	B-419-COMP-005	Hexavalent Chromium	8.5	mg/kg
Area5	B-419-COMP-005	Cobalt	6.6	mg/kg
Area5	B-419-TVHS	Cobalt 57	0.112	pCi/g
Area5	B-419-TVHS	Gross alpha	17.2	pCi/g
Area5	B-419-TVHS	Gross beta	15.5	pCi/g
Area5	B-419-TVHS	Plutonium 238	0.43	pCi/g
Area5	B-419-TVHS	Plutonium 239+240	6	pCi/g
Area5	B-419-TVHS	Protactinium 234m	29	pCi/g
Area5	B-419-TVHS	Strontium 90	1.68	pCi/g
Area5	B-419-TVHS	Thorium 230	0.54	pCi/g
Area5	B-419-TVHS	Thorium 232	0.358	pCi/g
Area5	B-419-TVHS	Thorium 228	0.389	pCi/g
Area5	B-419-TVHS	Thorium 234	7	pCi/g
Area5	B-419-TVHS	Tritium	147	pCi/g
Area5	B-419-TVHS	Uranium 234 and Uranium 233	4.09	pCi/g
Area5	B-419-TVHS	Uranium 235 and Uranium 236	0.263	pCi/g
Area5	B-419-TVHS	Uranium 238	6	pCi/g
Area5	B-419-TVHS	Americium 241	3.35	pCi/g
Area5	B-419-TVHS	Americium 241	2.36	pCi/g
Area5	B-419-TVHS	Antimony 124	0.16	pCi/g
Area5	B-419-TVHS	Bismuth 214	0.34	pCi/g

Composite Area	Sample Location	Analyte	Result	Units
Area5	B-419-TVHS	Cesium 137	0.87	pCi/g
Area6	B-419-031	Vanadium	31	mg/kg
Area6	B-419-031	Arsenic	4.5	mg/kg
Area6	B-419-031	Zinc	46	mg/kg
Area6	B-419-031	Barium	180	mg/kg
Area6	B-419-031	Gross beta	2.05	pCi/g
Area6	B-419-031	Gross alpha	2.52	pCi/g
Area6	B-419-031	Lead	5.1	mg/kg
Area6	B-419-031	Methylene chloride	81	ug/L*
Area6	B-419-031	Nickel	43	mg/kg
Area6	B-419-031	Chromium	32	mg/kg
Area6	B-419-031	Copper	36	mg/kg
Area6	B-419-031	Cobalt	7.4	mg/kg
Area6	B-419-031	Diesel Fuel	6.8	mg/kg
Area7	B-419-R1500	Arsenic	3.6	mg/kg
Area7	B-419-R1500	Barium	80	mg/kg
Area7	B-419-R1500	Vanadium	22	mg/kg
Area7	B-419-R1500	Zinc	29	mg/kg
Area7	B-419-R1500	Methylene chloride	81	ug/L*
Area7	B-419-R1500	Nickel	38	mg/kg
Area7	B-419-R1500	Diesel Fuel	5.4	mg/kg
Area7	B-419-R1500	Lead	3.5	mg/kg
Area7	B-419-R1500	Chromium	33	mg/kg
Area7	B-419-R1500	Hexavalent Chromium	5.6	mg/kg
Area7	B-419-R1500	Cobalt	7.1	mg/kg
Area7	B-419-R1500	Copper	33	mg/kg
Asphalt	B-419-012	Vanadium	27	mg/kg
Asphalt	B-419-012	Barium	110	mg/kg
Asphalt	B-419-012	Zinc	62	mg/kg
Asphalt	B-419-012	Arsenic	2.7	mg/kg
Asphalt	B-419-012	Mercury	0.086	mg/kg
Asphalt	B-419-012	Lead	13	mg/kg
Asphalt	B-419-012	Methylene chloride	66	ug/L*
Asphalt	B-419-012	Nickel	41	mg/kg
Asphalt	B-419-012	Copper	21	mg/kg
Asphalt	B-419-012	Cobalt	8.2	mg/kg
Asphalt	B-419-012	Chromium	29	mg/kg
Asphalt	B-419-012	Diesel Fuel	480	mg/kg
Asphalt	B-419-018	Copper	22	mg/kg

Composite Area	Sample Location	Analyte	Result	Units
Asphalt	B-419-018	Copper	19	mg/kg
Asphalt	B-419-018	Cobalt	7.2	mg/kg
Asphalt	B-419-018	Cobalt	6.7	mg/kg
Asphalt	B-419-018	Chromium	70	mg/kg
Asphalt	B-419-018	Chromium	69	mg/kg
Asphalt	B-419-018	Diesel Fuel	290	mg/kg
Asphalt	B-419-018	Diesel Fuel	260	mg/kg
Asphalt	B-419-018	Gross beta	2.52	pCi/g
Asphalt	B-419-018	Lead	6.1	mg/kg
Asphalt	B-419-018	Lead	5.2	mg/kg
Asphalt	B-419-018	Methylene chloride	70	ug/L*
Asphalt	B-419-018	Methylene chloride	68	ug/L*
Asphalt	B-419-018	Mercury	0.053	mg/kg
Asphalt	B-419-018	Mercury	0.058	mg/kg
Asphalt	B-419-018	Nickel	38	mg/kg
Asphalt	B-419-018	Nickel	32	mg/kg
Asphalt	B-419-018	Vanadium	24	mg/kg
Asphalt	B-419-018	Vanadium	23	mg/kg
Asphalt	B-419-018	Arsenic	3.7	mg/kg
Asphalt	B-419-018	Arsenic	3	mg/kg
Asphalt	B-419-018	Zinc	38	mg/kg
Asphalt	B-419-018	Zinc	34	mg/kg
Asphalt	B-419-018	Barium	170	mg/kg
Asphalt	B-419-018	Barium	150	mg/kg
Asphalt	B-419-025	Barium	190	mg/kg
Asphalt	B-419-025	Barium	160	mg/kg
Asphalt	B-419-025	Arsenic	2.9	mg/kg
Asphalt	B-419-025	Arsenic	2.8	mg/kg
Asphalt	B-419-025	Zinc	70	mg/kg
Asphalt	B-419-025	Zinc	59	mg/kg
Asphalt	B-419-025	Vanadium	23	mg/kg
Asphalt	B-419-025	Vanadium	22	mg/kg
Asphalt	B-419-025	Lead	10	mg/kg
Asphalt	B-419-025	Lead	12	mg/kg
Asphalt	B-419-025	Nickel	34	mg/kg
Asphalt	B-419-025	Nickel	41	mg/kg
Asphalt	B-419-025	Molybdenum	1.1	mg/kg
Asphalt	B-419-025	PCB 1254	150	ug/kg
Asphalt	B-419-025	Diesel Fuel	110	mg/kg

Composite Area	Sample Location	Analyte	Result	Units
Asphalt	B-419-025	Diesel Fuel	140	mg/kg
Asphalt	B-419-025	Methylene chloride	69	ug/L*
Asphalt	B-419-025	Methylene chloride	69	ug/L*
Asphalt	B-419-025	Mercury	0.039	mg/kg
Asphalt	B-419-025	Mercury	0.048	mg/kg
Asphalt	B-419-025	Copper	22	mg/kg
Asphalt	B-419-025	Copper	22	mg/kg
Asphalt	B-419-025	Cobalt	7.5	mg/kg
Asphalt	B-419-025	Cobalt	7.5	mg/kg
Asphalt	B-419-025	Chromium	28	mg/kg
Asphalt	B-419-025	Chromium	36	mg/kg
Asphalt	B-419-026	Cobalt	9.1	mg/kg
Asphalt	B-419-026	Chromium	28	mg/kg
Asphalt	B-419-026	Copper	19	mg/kg
Asphalt	B-419-026	Diesel Fuel	910	mg/kg
Asphalt	B-419-026	Methylene chloride	64	ug/L*
Asphalt	B-419-026	Lead	8.7	mg/kg
Asphalt	B-419-026	Nickel	43	mg/kg
Asphalt	B-419-026	PCB 1254	36	ug/kg
Asphalt	B-419-026	Vanadium	35	mg/kg
Asphalt	B-419-026	Barium	140	mg/kg
Asphalt	B-419-026	Arsenic	2.9	mg/kg
Asphalt	B-419-026	Zinc	35	mg/kg
Asphalt	B-419-027	Tritium	0.66	pCi/g
Asphalt	B-419-027	Vanadium	30	mg/kg
Asphalt	B-419-027	Barium	160	mg/kg
Asphalt	B-419-027	Barium	1.4	mg/L*
Asphalt	B-419-027	Zinc	140	mg/kg
Asphalt	B-419-027	Zinc	0.57	mg/L*
Asphalt	B-419-027	Methylene chloride	64	ug/L*
Asphalt	B-419-027	Mercury	0.23	mg/kg
Asphalt	B-419-027	Lead	75	mg/kg
Asphalt	B-419-027	Lead	0.27	mg/L*
Asphalt	B-419-027	Nickel	63	mg/kg
Asphalt	B-419-027	Cobalt	10	mg/kg
Asphalt	B-419-027	Chromium	56	mg/kg
Asphalt	B-419-027	Copper	28	mg/kg
Asphalt	B-419-027	Diesel Fuel	670	mg/kg
Asphalt	B-419-028	Barium	97	mg/kg

Composite Area	Sample Location	Analyte	Result	Units
Asphalt	B-419-028	Barium	130	mg/kg
Asphalt	B-419-028	Barium	0.91	mg/L*
Asphalt	B-419-028	Arsenic	2.6	mg/kg
Asphalt	B-419-028	Zinc	35	mg/kg
Asphalt	B-419-028	Zinc	36	mg/kg
Asphalt	B-419-028	Vanadium	27	mg/kg
Asphalt	B-419-028	Vanadium	26	mg/kg
Asphalt	B-419-028	Nickel	53	mg/kg
Asphalt	B-419-028	Nickel	66	mg/kg
Asphalt	B-419-028	Methylene chloride	55	ug/L*
Asphalt	B-419-028	Methylene chloride	58	ug/L*
Asphalt	B-419-028	Mercury	0.041	mg/kg
Asphalt	B-419-028	Mercury	0.037	mg/kg
Asphalt	B-419-028	Lead	6	mg/kg
Asphalt	B-419-028	Lead	5.1	mg/kg
Asphalt	B-419-028	Diesel Fuel	980	mg/kg
Asphalt	B-419-028	Diesel Fuel	860	mg/kg
Asphalt	B-419-028	Copper	19	mg/kg
Asphalt	B-419-028	Copper	22	mg/kg
Asphalt	B-419-028	Cobalt	8.2	mg/kg
Asphalt	B-419-028	Cobalt	9.7	mg/kg
Asphalt	B-419-028	Chromium	82	mg/kg
Asphalt	B-419-028	Chromium	110	mg/kg
Asphalt	B-419-029	Diesel Fuel	760	mg/kg
Asphalt	B-419-029	Copper	23	mg/kg
Asphalt	B-419-029	Cobalt	8.9	mg/kg
Asphalt	B-419-029	Chromium	89	mg/kg
Asphalt	B-419-029	Nickel	56	mg/kg
Asphalt	B-419-029	Methylene chloride	60	ug/L*
Asphalt	B-419-029	Mercury	0.051	mg/kg
Asphalt	B-419-029	Lead	8.7	mg/kg
Asphalt	B-419-029	Barium	190	mg/kg
Asphalt	B-419-029	Barium	2	mg/L*
Asphalt	B-419-029	Zinc	46	mg/kg
Asphalt	B-419-029	Vanadium	32	mg/kg
Asphalt	B-419-030	Barium	160	mg/kg
Asphalt	B-419-030	Barium	2.5	mg/L*
Asphalt	B-419-030	Vanadium	20	mg/kg
Asphalt	B-419-030	Zinc	38	mg/kg

Composite Area	Sample Location	Analyte	Result	Units
Asphalt	B-419-030	Mercury	0.084	mg/kg
Asphalt	B-419-030	Lead	5.3	mg/kg
Asphalt	B-419-030	Methylene chloride	58	ug/L*
Asphalt	B-419-030	Nickel	36	mg/kg
Asphalt	B-419-030	Chromium	33	mg/kg
Asphalt	B-419-030	Copper	20	mg/kg
Asphalt	B-419-030	Cobalt	7.3	mg/kg
Asphalt	B-419-030	Diesel Fuel	40	mg/kg
Asphalt	B-419-035	PCB 1260	40	ug/kg
Asphalt	B-419-035	Vanadium	24	mg/kg
Asphalt	B-419-035	Arsenic	2.7	mg/kg
Asphalt	B-419-035	Zinc	69	mg/kg
Asphalt	B-419-035	Barium	140	mg/kg
Asphalt	B-419-035	Barium	0.95	mg/L*
Asphalt	B-419-035	Mercury	0.41	mg/kg
Asphalt	B-419-035	Lead	11	mg/kg
Asphalt	B-419-035	Methylene chloride	53	ug/L*
Asphalt	B-419-035	Nickel	68	mg/kg
Asphalt	B-419-035	Cadmium	1.1	mg/kg
Asphalt	B-419-035	Chromium	36	mg/kg
Asphalt	B-419-035	Copper	24	mg/kg
Asphalt	B-419-035	Cobalt	8.6	mg/kg
Asphalt	B-419-035	Diesel Fuel	1300	mg/kg
Asphalt	B-419-036	Chromium	20	mg/kg
Asphalt	B-419-036	Copper	21	mg/kg
Asphalt	B-419-036	Cobalt	5.8	mg/kg
Asphalt	B-419-036	Mercury	0.22	mg/kg
Asphalt	B-419-036	Lead	16	mg/kg
Asphalt	B-419-036	Nickel	38	mg/kg
Asphalt	B-419-036	Zinc	62	mg/kg
Asphalt	B-419-036	Tritium	0.252	pCi/g
Asphalt	B-419-036	Vanadium	28	mg/kg
Asphalt	B-419-036	Arsenic	1.6	mg/kg
Asphalt	B-419-036	Barium	66	mg/kg
Asphalt	B-419-036A	Diesel Fuel	440	mg/kg
Asphalt	B-419-036A	Methylene chloride	49	ug/L*
Asphalt	B-419-037	Tritium	0.286	pCi/g
Asphalt	B-419-037	Vanadium	25	mg/kg
Asphalt	B-419-037	Vanadium	27	mg/kg

Composite Area	Sample Location	Analyte	Result	Units
Asphalt	B-419-037	Arsenic	2.7	mg/kg
Asphalt	B-419-037	Arsenic	3.4	mg/kg
Asphalt	B-419-037	Barium	150	mg/kg
Asphalt	B-419-037	Barium	170	mg/kg
Asphalt	B-419-037	Zinc	53	mg/kg
Asphalt	B-419-037	Zinc	44	mg/kg
Asphalt	B-419-037	Methylene chloride	42	ug/L*
Asphalt	B-419-037	Methylene chloride	46	ug/L*
Asphalt	B-419-037	Molybdenum	1.2	mg/kg
Asphalt	B-419-037	Molybdenum	1.6	mg/kg
Asphalt	B-419-037	Nickel	56	mg/kg
Asphalt	B-419-037	Nickel	47	mg/kg
Asphalt	B-419-037	PCB 1254	42	ug/kg
Asphalt	B-419-037	Mercury	9.3	mg/kg
Asphalt	B-419-037	Lead	14	mg/kg
Asphalt	B-419-037	Lead	12	mg/kg
Asphalt	B-419-037	Mercury	7.6	mg/kg
Asphalt	B-419-037	Mercury	0.0022	mg/L*
Asphalt	B-419-037	Diesel Fuel	580	mg/kg
Asphalt	B-419-037	Diesel Fuel	640	mg/kg
Asphalt	B-419-037	Cadmium	0.96	mg/kg
Asphalt	B-419-037	Chromium	38	mg/kg
Asphalt	B-419-037	Chromium	31	mg/kg
Asphalt	B-419-037	Copper	28	mg/kg
Asphalt	B-419-037	Copper	24	mg/kg
Asphalt	B-419-037	Cobalt	11	mg/kg
Asphalt	B-419-037	Cobalt	7.8	mg/kg
Asphalt	B-419-039	Zinc	36	mg/kg
Asphalt	B-419-039	Barium	0.69	mg/L*
Asphalt	B-419-039	Barium	100	mg/kg
Asphalt	B-419-039	Barium	3.7	mg/L*
Asphalt	B-419-039	PCB 1254	570	ug/kg
Asphalt	B-419-039	Vanadium	39	mg/kg
Asphalt	B-419-039	Arsenic	2.3	mg/kg
Asphalt	B-419-039	Mercury	6.1	mg/kg
Asphalt	B-419-039	Mercury	0.0032	mg/L*
Asphalt	B-419-039	Lead	10	mg/kg
Asphalt	B-419-039	Lead	0.44	mg/L*
Asphalt	B-419-039	Mercury	0.003	mg/L*

Composite Area	Sample Location	Analyte	Result	Units
Asphalt	B-419-039	Methylene chloride	47	ug/L*
Asphalt	B-419-039	Nickel	64	mg/kg
Asphalt	B-419-039	Chromium	34	mg/kg
Asphalt	B-419-039	Copper	22	mg/kg
Asphalt	B-419-039	Cobalt	8.3	mg/kg
Asphalt	B-419-039	Diesel Fuel	1200	mg/kg
Asphalt	B-419-102	Vanadium	24	mg/kg
Asphalt	B-419-102	Vanadium	25	mg/kg
Asphalt	B-419-102	Zinc	40	mg/kg
Asphalt	B-419-102	Zinc	43	mg/kg
Asphalt	B-419-102	Arsenic	2	mg/kg
Asphalt	B-419-102	Arsenic	2.1	mg/kg
Asphalt	B-419-102	Barium	97	mg/kg
Asphalt	B-419-102	Barium	94	mg/kg
Asphalt	B-419-102	Methylene chloride	420	ug/L*
Asphalt	B-419-102	Methylene chloride	420	ug/L*
Asphalt	B-419-102	Nickel	37	mg/kg
Asphalt	B-419-102	Nickel	41	mg/kg
Asphalt	B-419-102	PCB 1254	92	ug/kg
Asphalt	B-419-102	PCB 1254	140	ug/kg
Asphalt	B-419-102	Lead	17	mg/kg
Asphalt	B-419-102	Lead	21	mg/kg
Asphalt	B-419-102	Mercury	0.071	mg/kg
Asphalt	B-419-102	Mercury	0.39	mg/kg
Asphalt	B-419-102	Diesel Fuel	610	mg/kg
Asphalt	B-419-102	Diesel Fuel	500	mg/kg
Asphalt	B-419-102	Chromium	23	mg/kg
Asphalt	B-419-102	Chromium	29	mg/kg
Asphalt	B-419-102	Cobalt	6.9	mg/kg
Asphalt	B-419-102	Cobalt	7.7	mg/kg
Asphalt	B-419-102	Copper	21	mg/kg
Asphalt	B-419-102	Copper	20	mg/kg
* - Indicates Toxicity characteristic leaching procedure (TCLP) or Soluble Threshold Limit Concentration (STL				
All results from B-419-014 are collected at a depth of 4.5 feet.				

Appendix L

Response to Comments

B419 Closure Performance Standards

Department of Toxic Substances Control
May 22, 2012

Lawrence Livermore National Laboratory

LLNL-PRES-557761
This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under contract DE-AC52-07NA27344. Lawrence Livermore National Security, LLC

Agenda

- Regulatory Setting and Historical Use of Building 419
- Summary of Closure Activities to Date
- Comparison of Soil Analytical Results to Human Health Screening Levels and Potential Impact to Groundwater
- Closure Activity Schedule and Path Forward

Lawrence Livermore National Laboratory – Livermore Site

The Livermore Main Site (Site 200) is approximately 800 acres in size and is located about 3 miles east of downtown Livermore

LLNL regulated under RCRA and CERCLA since the 1980's

- The 1980 RCRA Part A permit application identified Building 419 as one of several discrete, active LLNL waste management operations subject to the newly enacted regulations
- Similarly, discovery of groundwater contamination in 1983 triggered further investigation and subsequent listing of the LLNL site on the NPL in 1987 and subject to CERCLA
- Generally, on-going LLNL hazardous waste operations and CERCLA cleanup activities have progressed on parallel but separate paths
  - In the case of B419, there is some overlap as there is active remediation of tritium and VOCs in groundwater underlying this area

Historical Use of Building 419

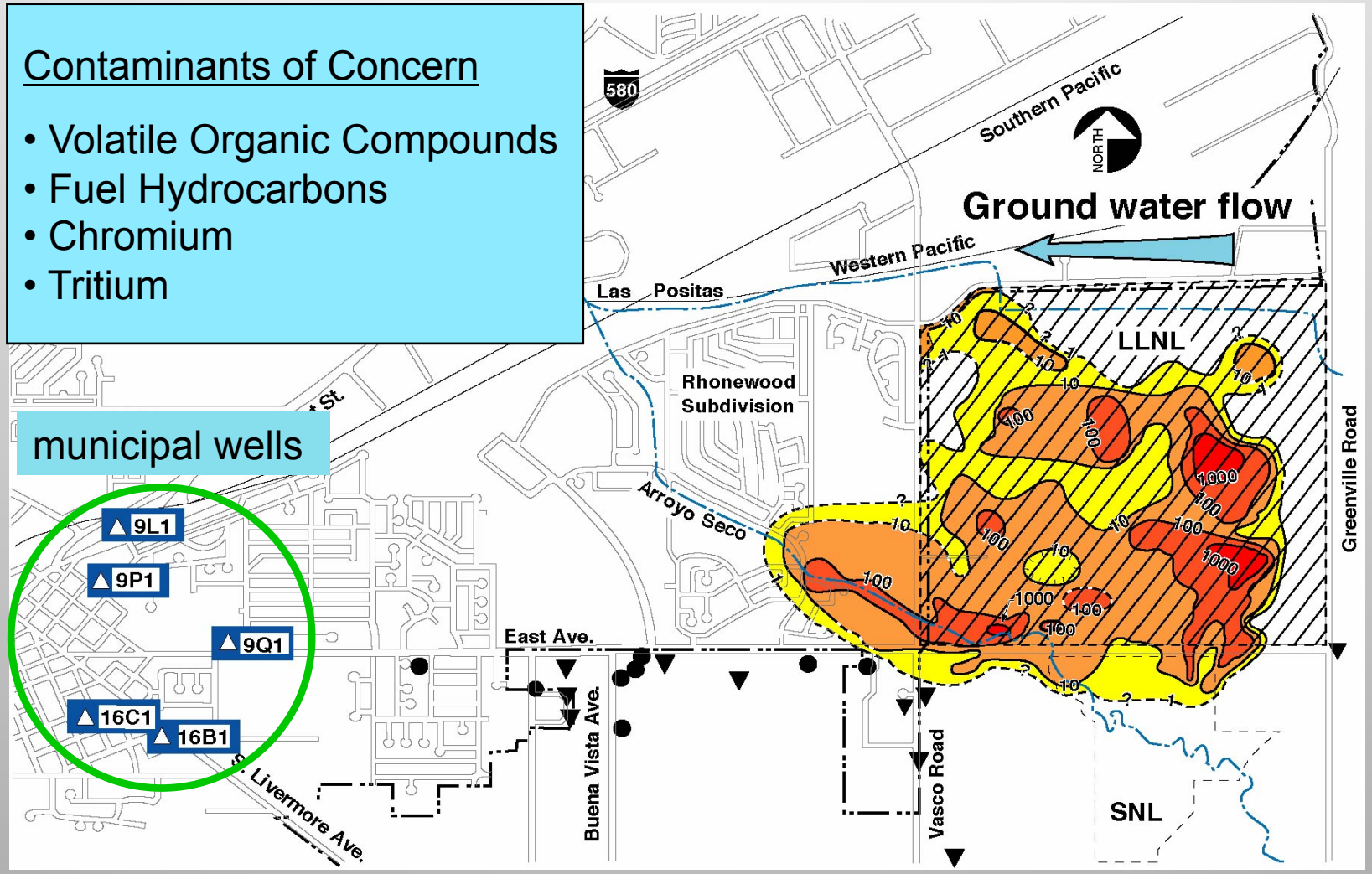
- Building 419 was constructed in 1942 and was first used by the U.S. Navy for airplane assembly and maintenance
- LLNL's Health Chemistry Program then used this facility as an assay laboratory
- Between 1975 and 1989, LLNL used this facility for equipment decontamination and hazardous and mixed waste treatment (size reduction and solidification) activities
- Building 419 was first identified as a RCRA treatment facility on 1980 Part A submittal, operated under interim status and a Part B permit application was filed in the mid-1980s
- Hazardous and mixed waste treatment activities were discontinued within the facility due to the results of a seismic evaluation conducted in 1991 that indicated that Building 419 could not meet the Uniform Building Code seismic guidelines

B419 (1940s)

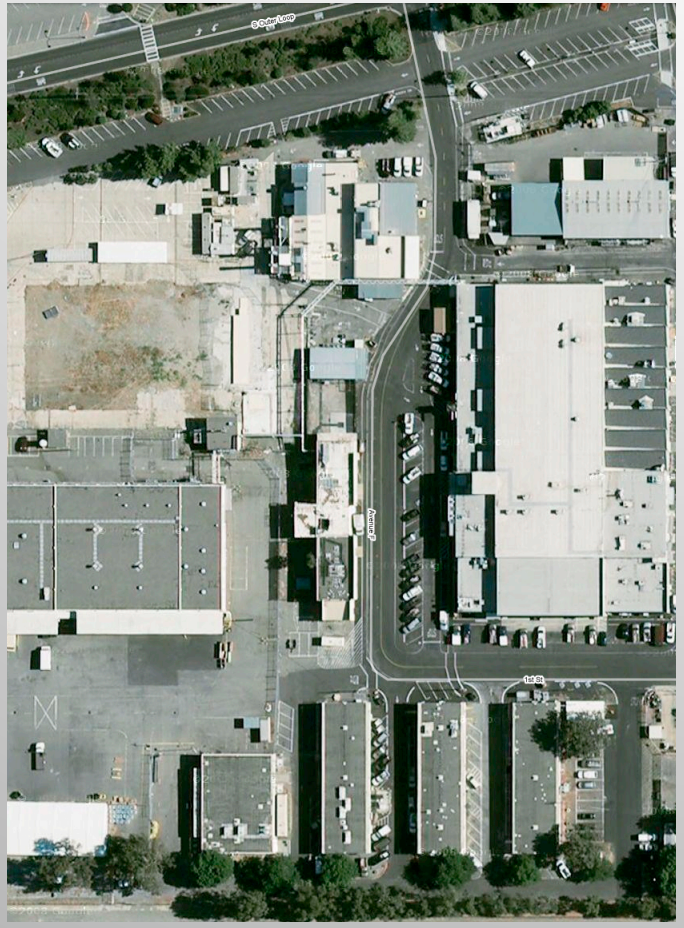
Multiple supply wells within 3 miles of the plume placed LLNL on Superfund National Priority List

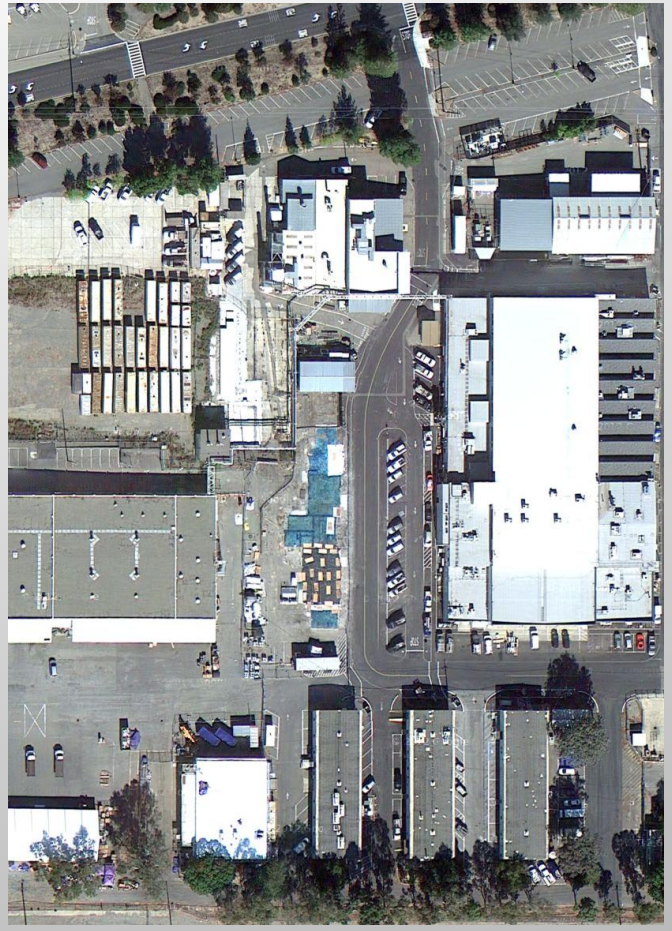
Contaminants of Concern

- Volatile Organic Compounds
- Fuel Hydrocarbons
- Chromium
- Tritium



B419 (2009 and 2011)





Summary of Closure Activities To Date

- The majority of the closure activities were completed in the following order:
  - Utility deactivation
  - Facility abatement
  - Facility bulk sampling and analyses
  - Asphalt/soil sampling and analyses
  - Facility demolition
  - Disposal of facility structure, debris, rinsewater, and collected rainwater
  - Concrete sampling and analyses
  - Sampling and analyses of 35 soil samples collected from the LLNL site to develop metals and radiological background levels
  - Soil sampling beneath facility structure
  - Detailed evaluation of data to determine next steps to achieve final closure

Removal and disposal of concrete foundation and tank vault remain to be completed.

Concrete Composite Sample Locations

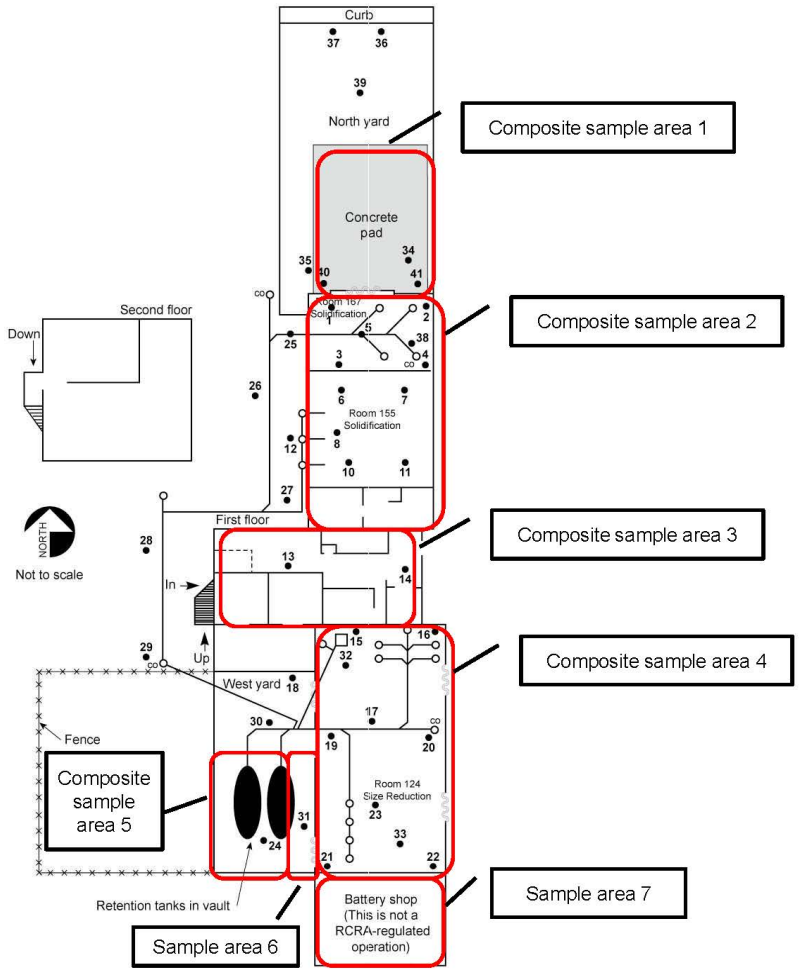
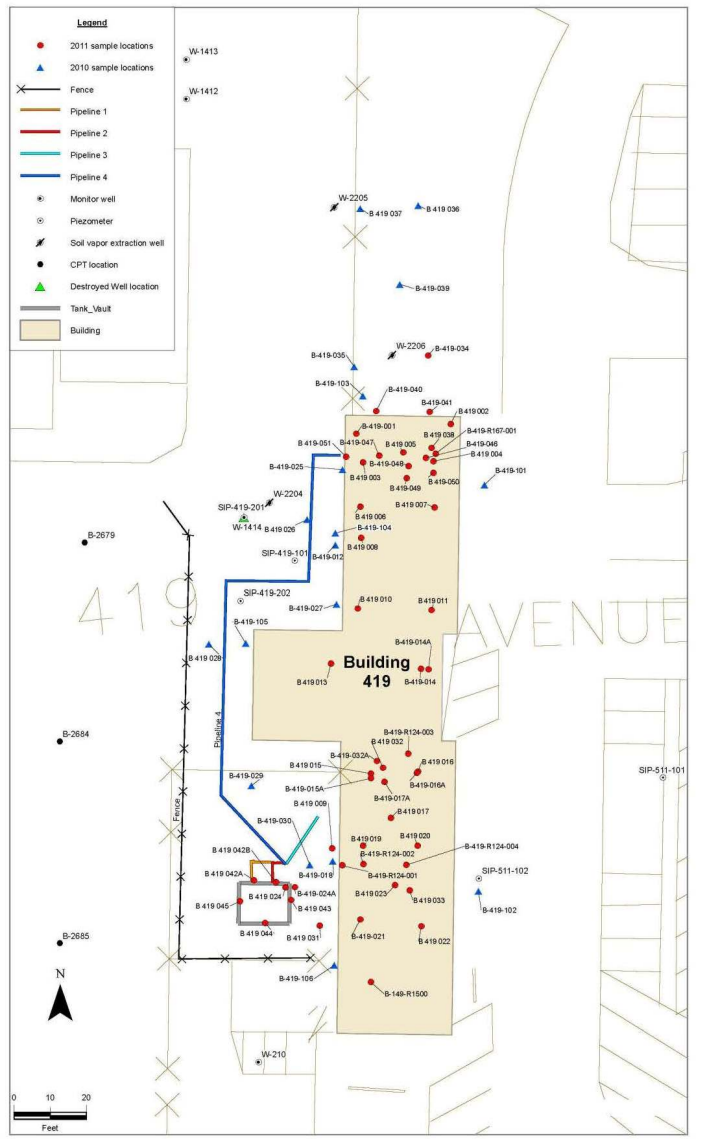
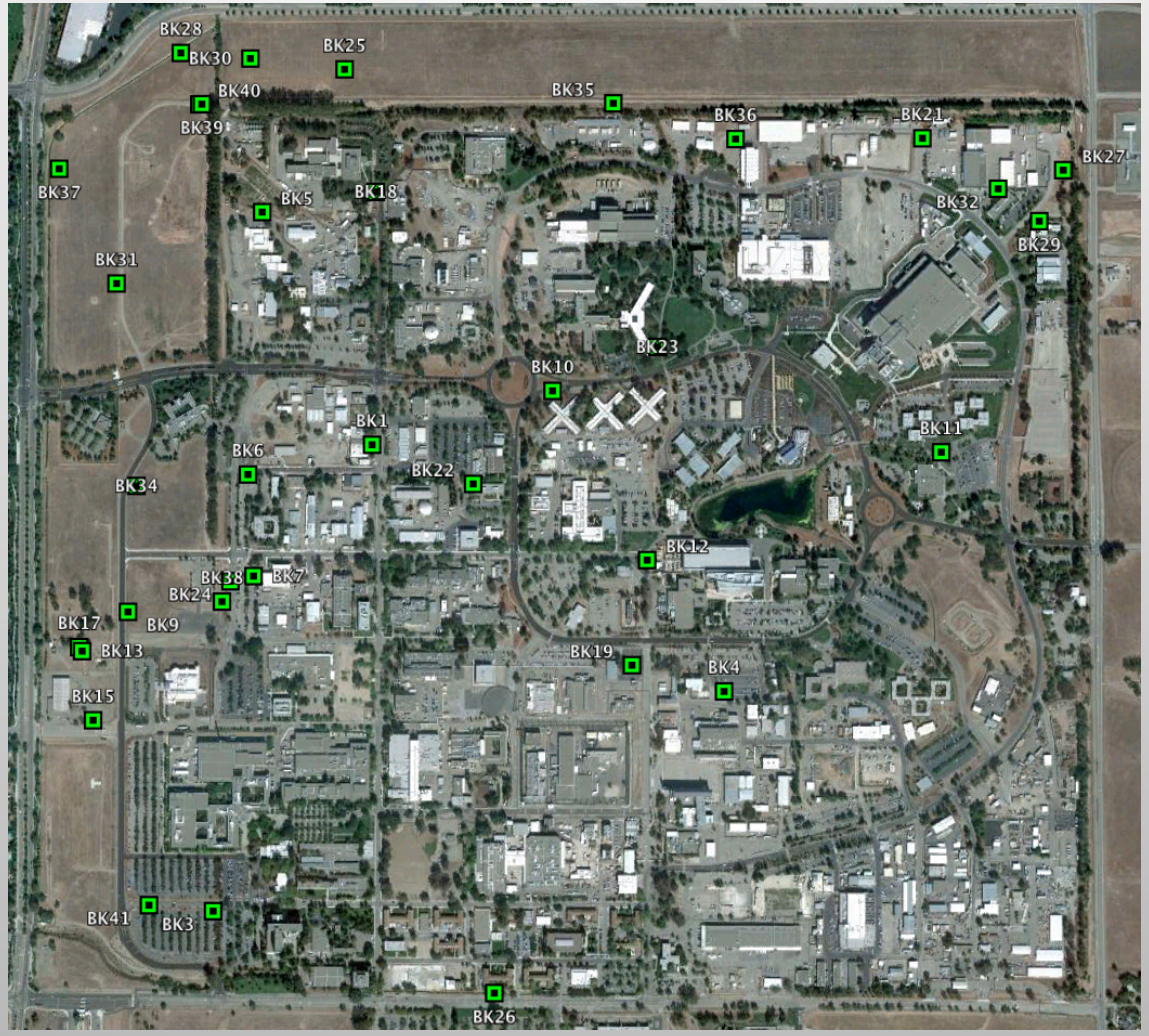


Figure A-2. Sample borehole locations at the B-419 Facility

Concrete, Asphalt and Soil (CAS) Sample Locations



Project-Specific Background Soil Sample Locations based on MARSSIM Methodology



Project-Specific Metals and Radiological Soil Background Levels

Description	ParType	Screening value (mg/kg)
Antimony	Metal	2.2
Arsenic	Metal	7.59
Barium	Metal	332
Beryllium	Metal	0.55
Cadmium	Metal	0.55
Chromium	Metal	48.9
Cobalt	Metal	16.7
Copper	Metal	35.8
Hexavalent Chromium	Metal	2.2
Lead	Metal	14.3
Mercury	Metal	0.0759
Molybdenum	Metal	1.1
Nickel	Metal	70.1
Selenium	Metal	0.55
Silver	Metal	1.1
Thallium	Metal	1.1
Vanadium	Metal	43.7
Zinc	Metal	69.8
Description	**ParType**	**Screening value (pCi/g)**
Actinium 228	Radiological	1.5
Aluminum 26	Radiological	0.133
Am 241 GS	Radiological	0.539
Americium 241	Radiological	0.062
Antimony 124	Radiological	0.145
Antimony 125	Radiological	0.35
Beryllium 7	Radiological	1.15
Bismuth 212	Radiological	2.52
Bismuth 214	Radiological	0.912
Carbon 14	Radiological	10.2
Cerium 139	Radiological	0.0777
Cerium 144	Radiological	0.626
Cesium 134	Radiological	0.189
Cesium 137	Radiological	0.16
Chromium 51	Radiological	0.957
Cobalt 56	Radiological	0.428
Cobalt 57	Radiological	0.0547
Cobalt 58	Radiological	0.181

Description	ParType	Screening value (pCi/g)
Cobalt 60	Radiological	0.154
Curium 242	Radiological	0.0143
Curium 244	Radiological	0.0269
Europium 152	Radiological	0.88
Europium 154	Radiological	0.852
Europium 155	Radiological	0.34
Gross alpha	Radiological	3.38
Gross beta	Radiological	4.47
Iodine 131	Radiological	0.395
Iron 59	Radiological	0.399
Lead 212	Radiological	0.938
Lead 214	Radiological	0.844
Manganese 54	Radiological	0.159
Niobium 94	Radiological	0.137
Niobium 95	Radiological	0.169
Plutonium 238	Radiological	0.0355
Plutonium 239+240	Radiological	0.046
Potassium 40	Radiological	18.4
Protactinium 234m	Radiological	29.6
Ruthenium 106	Radiological	1.25
Scandium 46	Radiological	0.134
Silver 110m	Radiological	0.161
Sodium 22	Radiological	0.188
Strontium 90	Radiological	0.264
Technetium 99	Radiological	0.647
Thallium 208	Radiological	0.371
Thorium 227	Radiological	1.05
Thorium 228	Radiological	0.991
Thorium 230	Radiological	0.957
Thorium 232	Radiological	0.983
Thorium 234	Radiological	2.44
Tritium	Radiological	0.106
Uranium 234 and Uranium 233	Radiological	0.76
Uranium 235	Radiological	0.645
Uranium 235 and Uranium 236	Radiological	0.0904
Uranium 238	Radiological	0.717
Zinc 65	Radiological	0.261

Impact to human receptors was systematically evaluated by primary pathways

Constituents of potential concern (COPCs) identified

- Compared all soil data to new background levels
- Any data > background values = COPC

Compared each COPC to published standards

- On-site receptors (industrial and residential standards for soil)
- Off-site receptors (residential standards for groundwater)

Created 3-D graphical display of areas containing COPCs

- Reflects areas of concern by COPC(s)
- Estimates approximate volumes of impacted soil

Recommended action to complete closure

- Removal of remaining slab and foundation materials, and targeted removal of contaminated soil

Published standards used to evaluate COPCs

- U.S.EPA Regional Screening Levels (RSLs) – formerly known as Preliminary Remedial Goals (PRGs)
  - Industrial
  - Residential
- SFB-RWQCB Environmental Screening Levels (ESLs)
  - Industrial
  - Residential
- Maximum Contaminant Levels (MCLs) for groundwater

Screening Levels (mg/kg)

COPC	Site Background	Residential RSL / ESL	Industrial RSL / ESL	Maximum Detected
Arsenic	7.59 (*11.0*)	0.39 / 0.39	1.6 / 1.6	37
Benzo(b) Fluoranthene*		0.15 / 0.38	**2.0** / 1.3	0.42
Cobalt	16.7	23 / 40	**300** / 80	170
Diesel Fuel		- / 83	- / **83**	610
Hexavalent Chromium	2.2	0.29 / 8.0	5.6 / **8.0**	12
Mercury*	0.076	10 / 1.3	**43** / 10	66
PCB 1248		- / 0.22	- / **0.74**	0.35
PCB 1254		- / 0.22	- / **0.74**	6.9

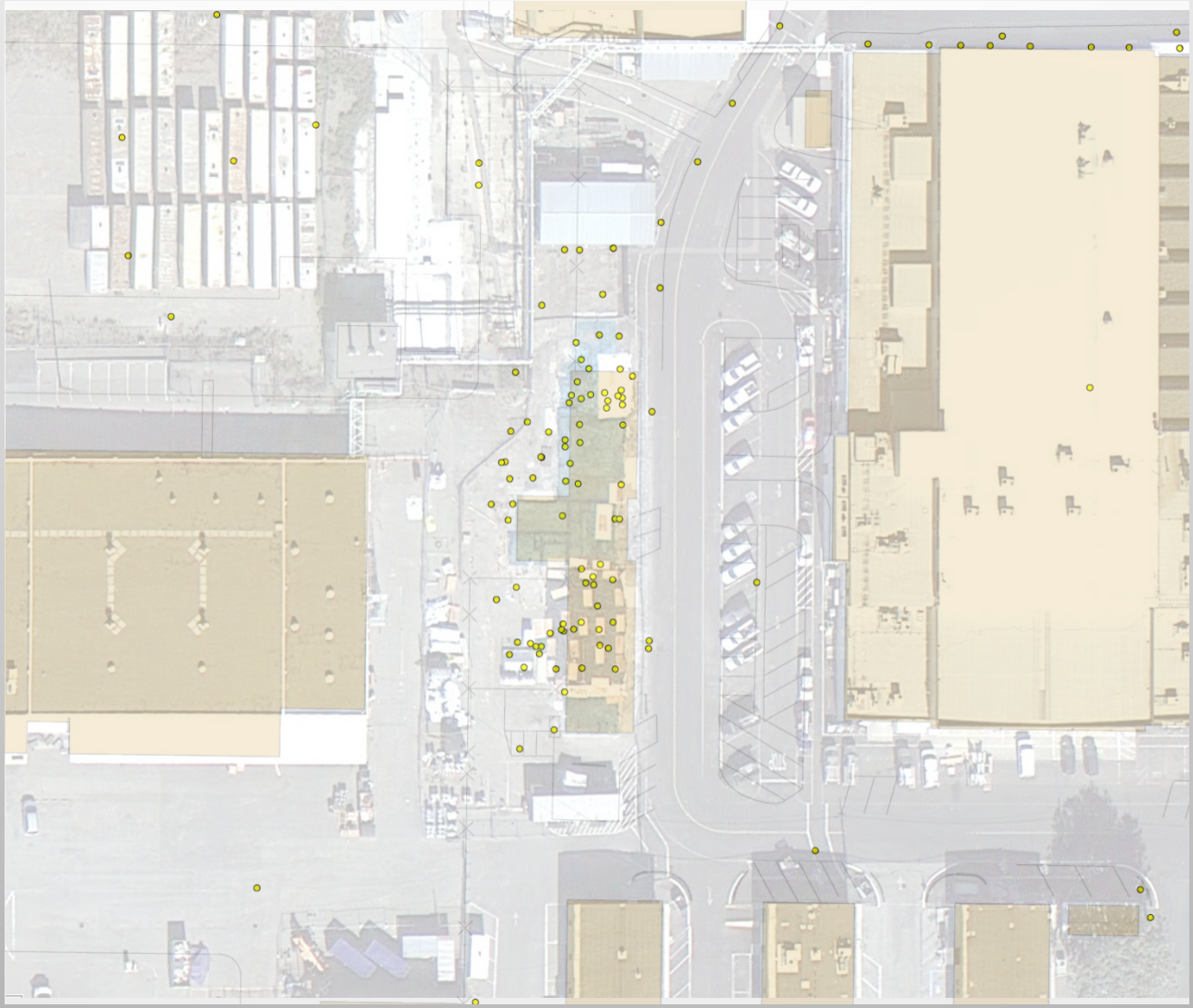
RSL – U.S. EPA Regional Screening Levels (former PRGs)
ESL – SF Regional Water Quality Control Board Environmental Screening Levels.
* COPC with potential impact to ground water.

Overall Approach

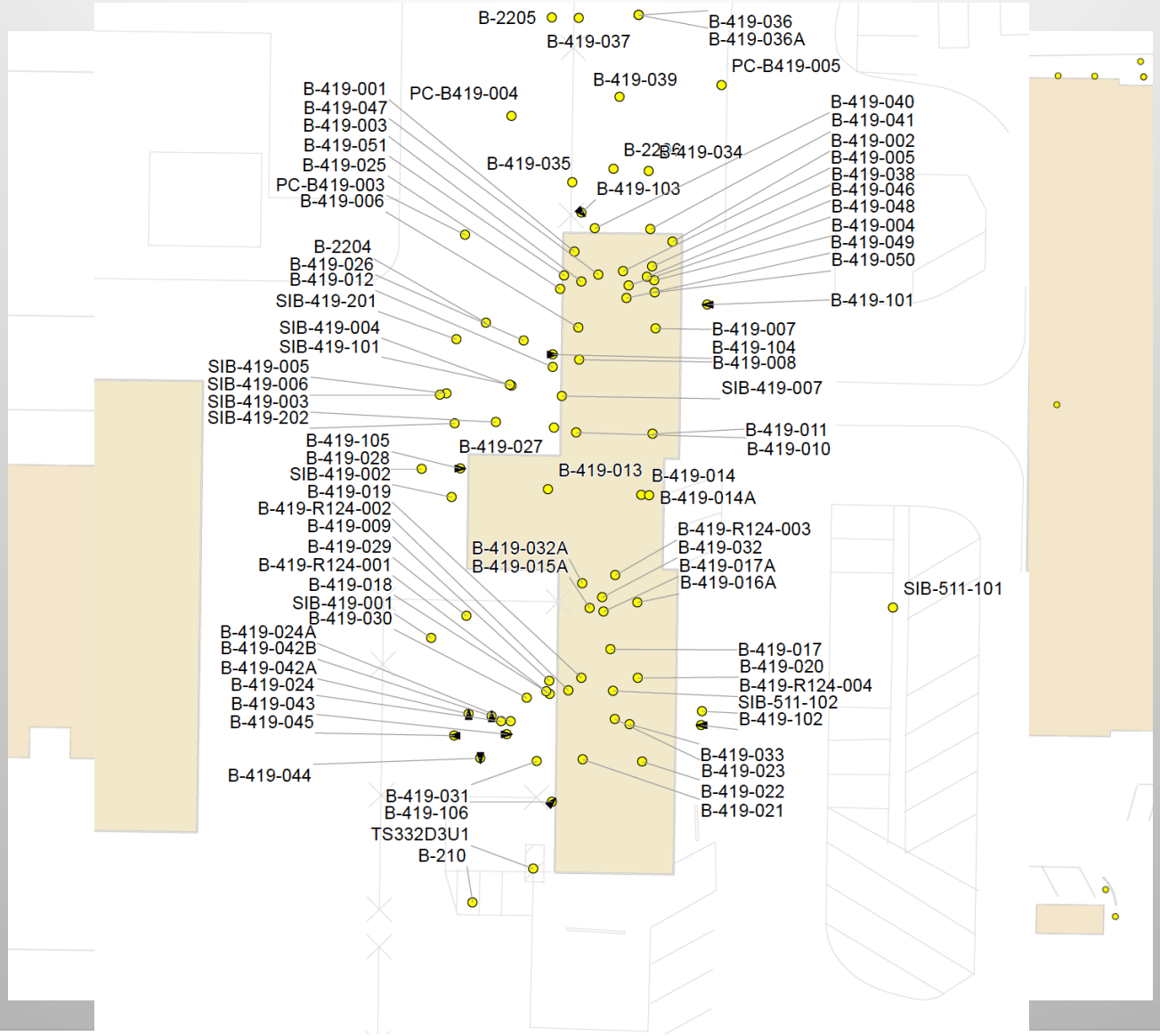
Site characterization	Data Review	Determine constituents of potential concern (COPC)	Receptors	Standards	Tier1 Screening	Tier2 Analysis	Decision Point
Soil data	All soil data for each constituent from Bldg. 419 Area *Exclude:* *Concrete and AB samples* *Tritium and VOC results (CERCLA remediation is ongoing)* *TCLP and STLC analysis results collected for waste characterization.*	All soil data from each constituent, exceeding site background values, are considered COPCs. *Background values are determined using the MARSSIM approach* *Ecorisk is not included in determining COPCs*	Protection of human health	Industrial	US. EPA RSL (composite)		1.Targeted removal
					SF RWQCB ESLs (composite, shallow and deep soil)		2. Human Health Risk Assessment (HHRA) then Targeted removal
				Residential	US. EPA RSL (composite)		
					SF RWQCB ESLs (composite, shallow and deep soil)		3. Pathway specific remedy (i.e. paving)
			Protection of ground water	Residential (MCL)	US. EPA RSL for ground water	Site specific modeling (conservative assumptions)	1.Targeted removal
					SF RWQCB ESLs for ground water (shallow and deep soil)		2. Site specific modeling (site specific parameters)

US. EPA Regional Screening levels (RSLs):
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm
http://www.epa.gov/region9/superfund/prg/rsl-table.html
http://www.epa.gov/region9/superfund/prg/
http://rais.ornl.gov/rad_start.shtml
http://epa-prgs.ornl.gov/radionuclides/download.html
San Francisco Regional Water Quality Control Board Environmental Screening Levels (ESLs):
http://www.swrcb.ca.gov/rwqcb2/esl.shtml

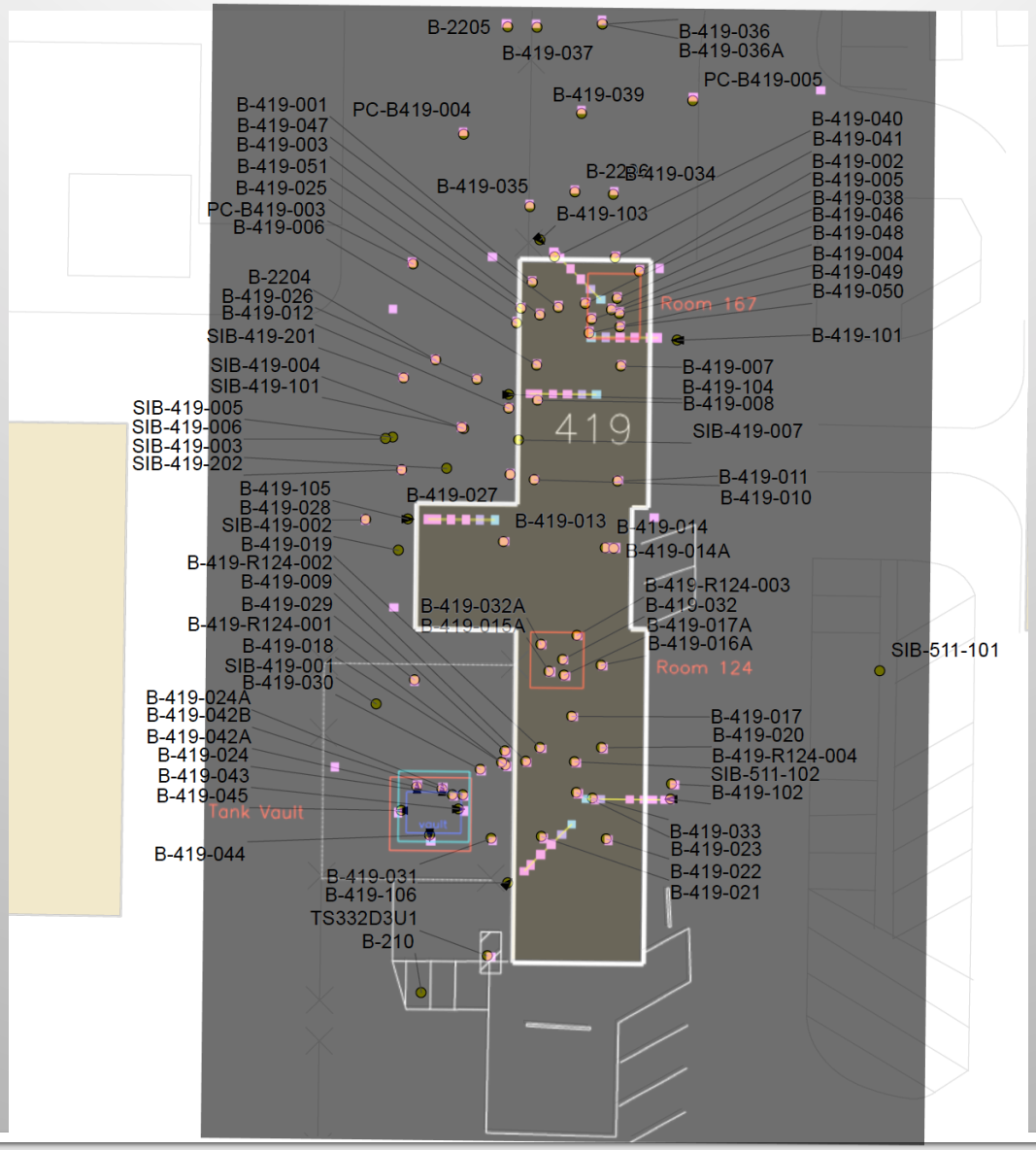
Building 419 – Current conditions



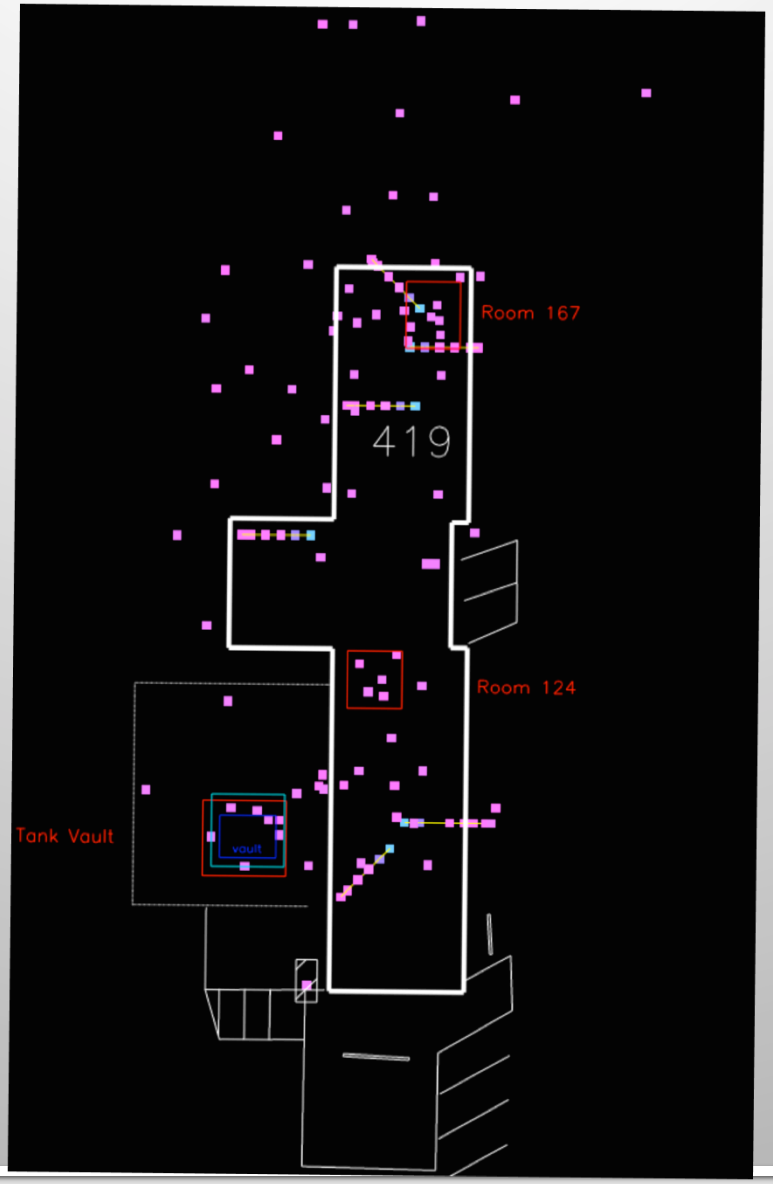
Building 419 – Sampling locations



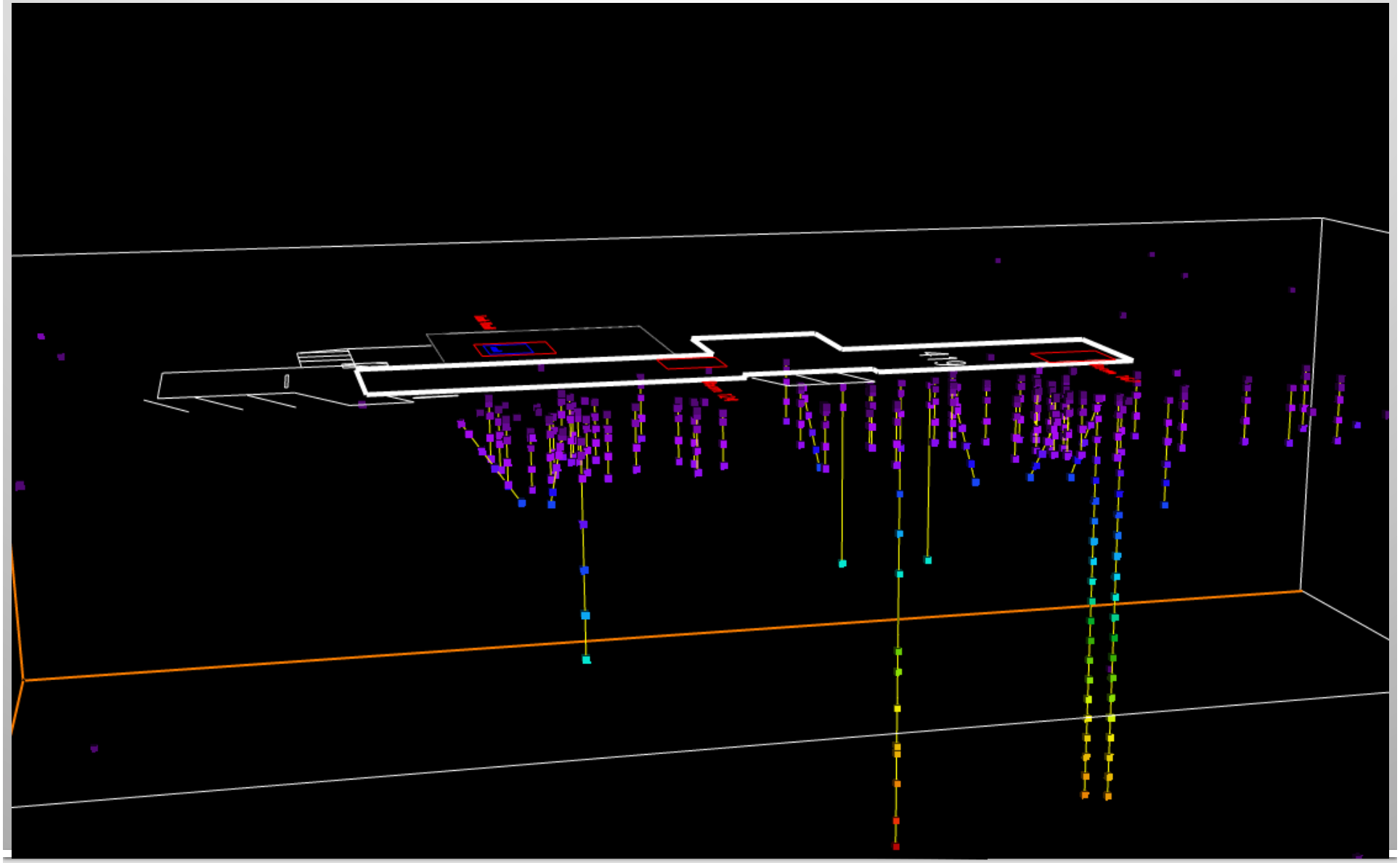
Building 419 – Sampling locations



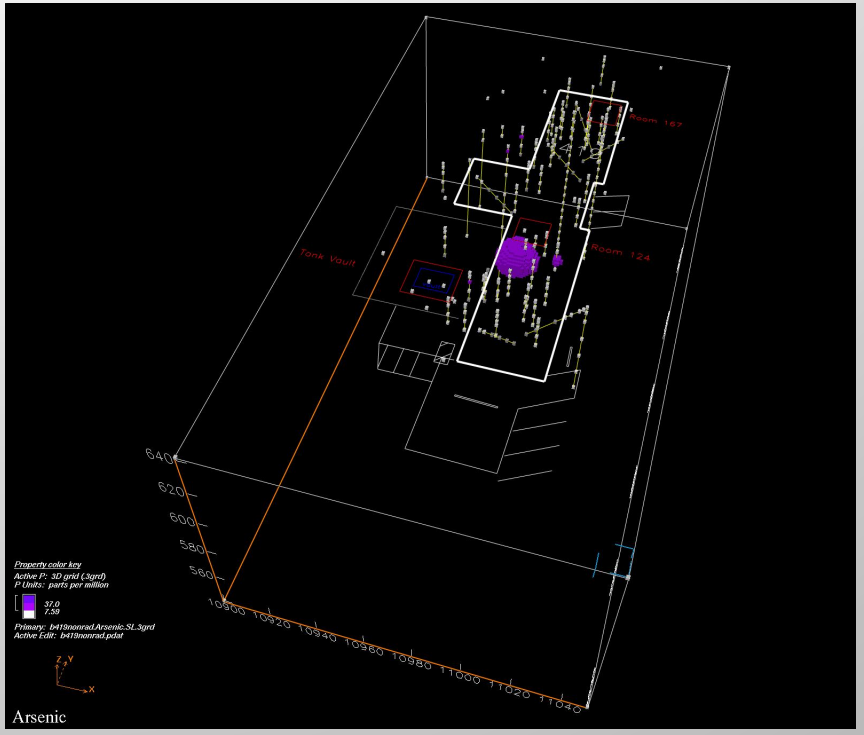
Building 419 – Sampling Locations



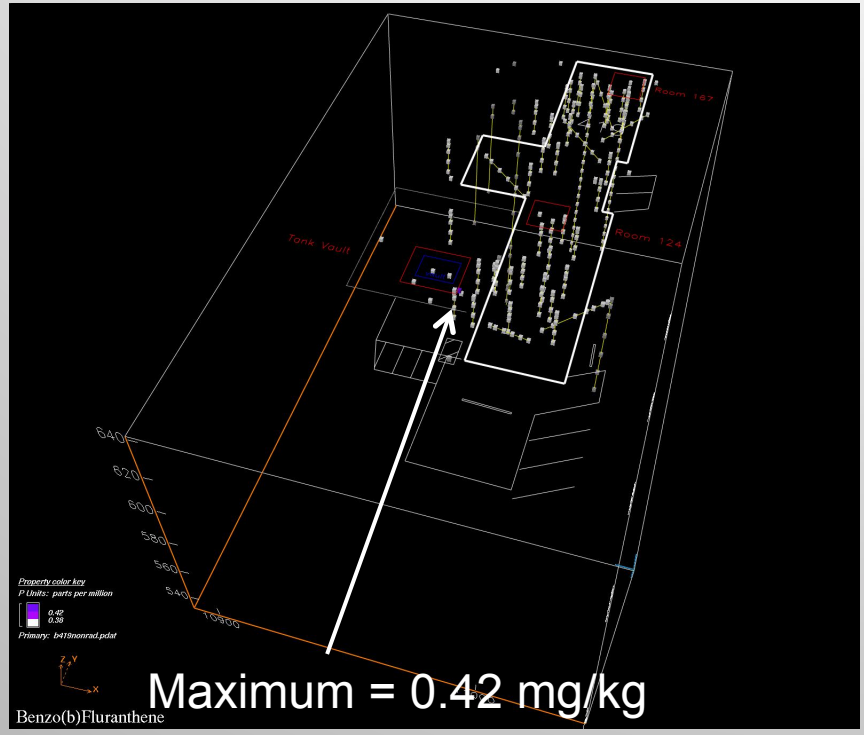
Building 419 – Sampling Locations

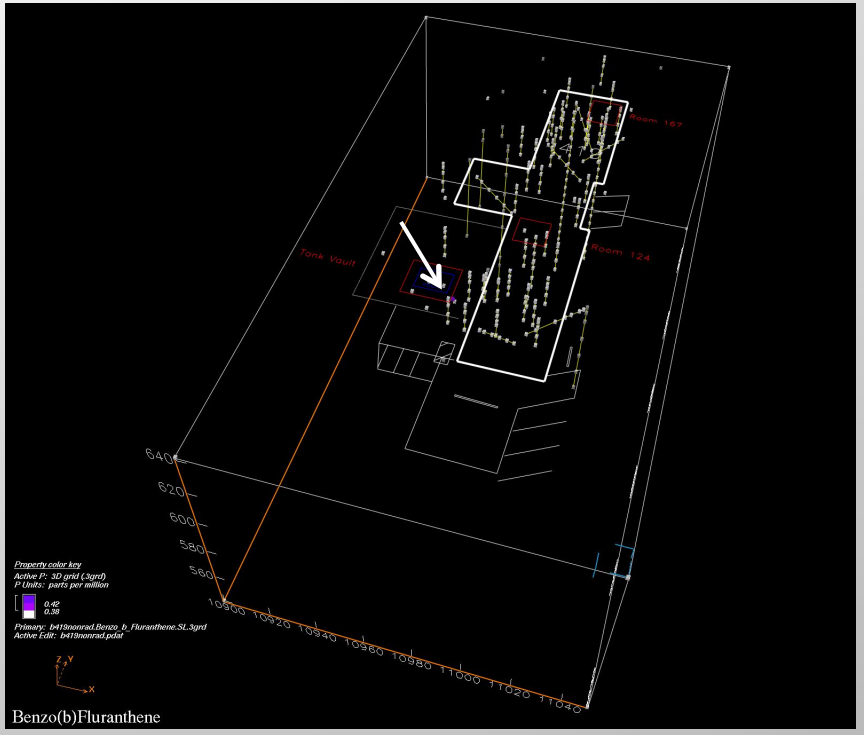


Arsenic
Site background = 7.59 mg/kg

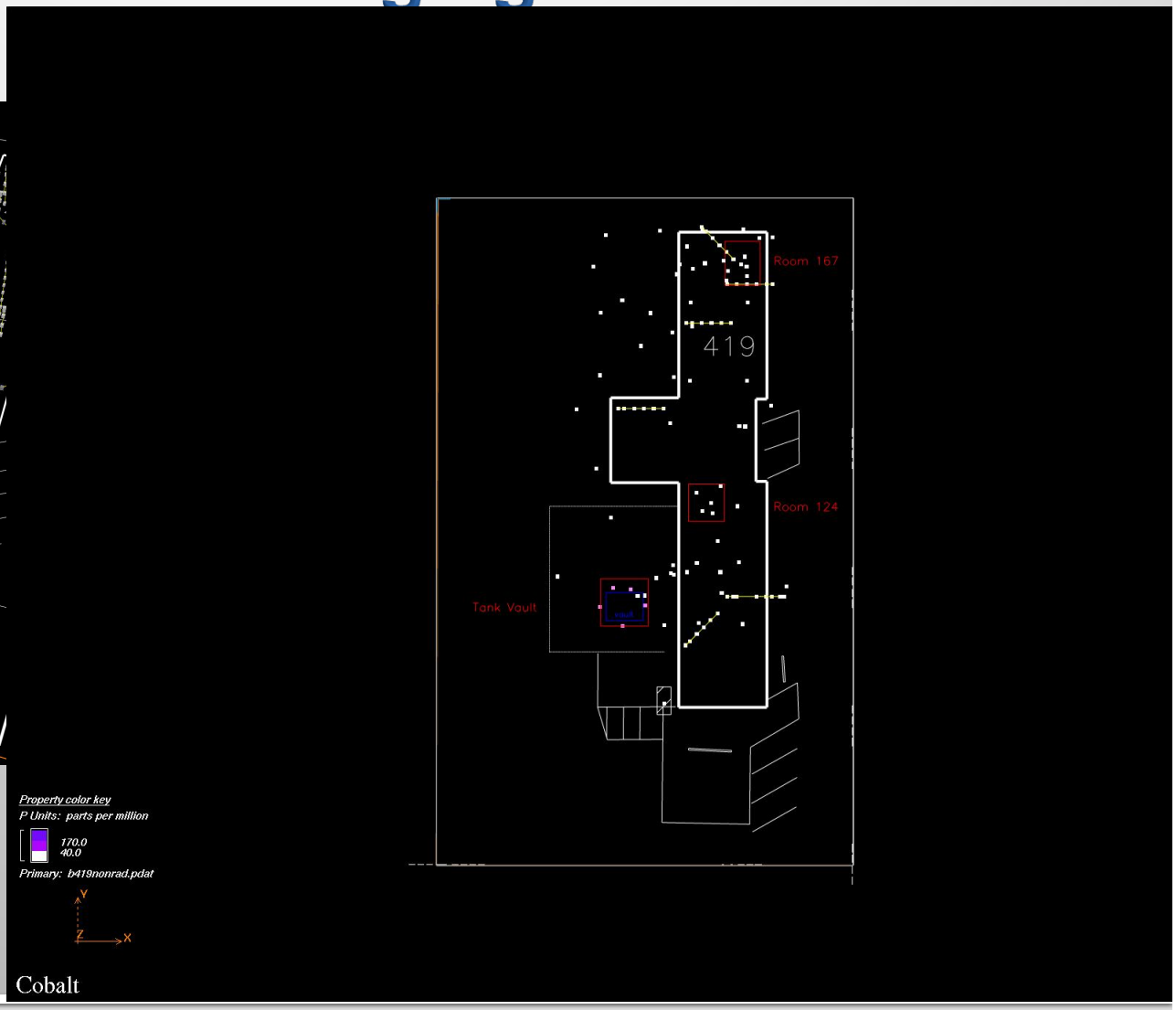


Benzo(b)Fluoranthene
Residential ESL = 0.38 mg/kg

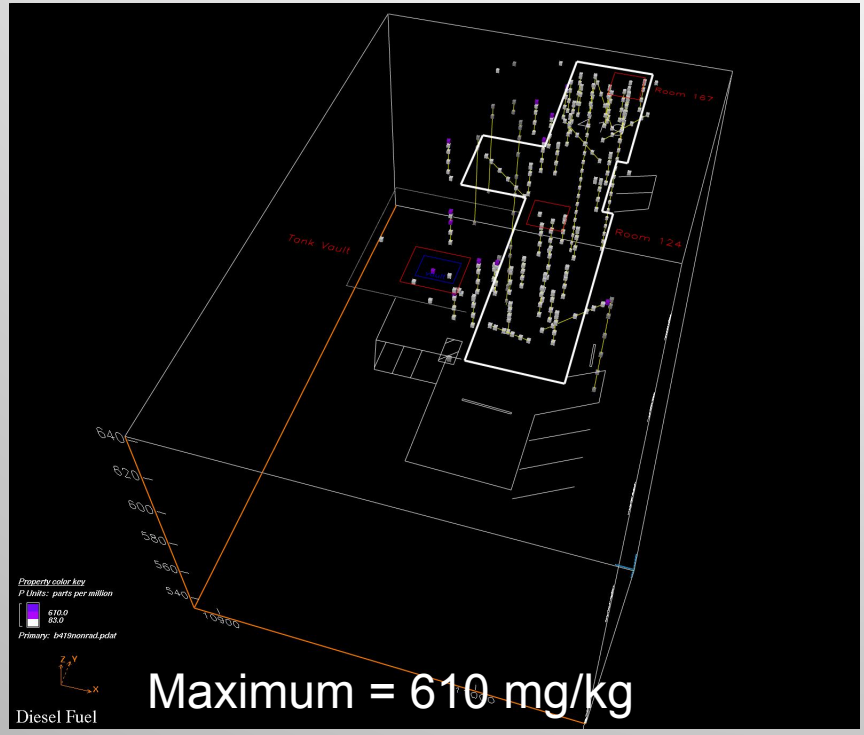


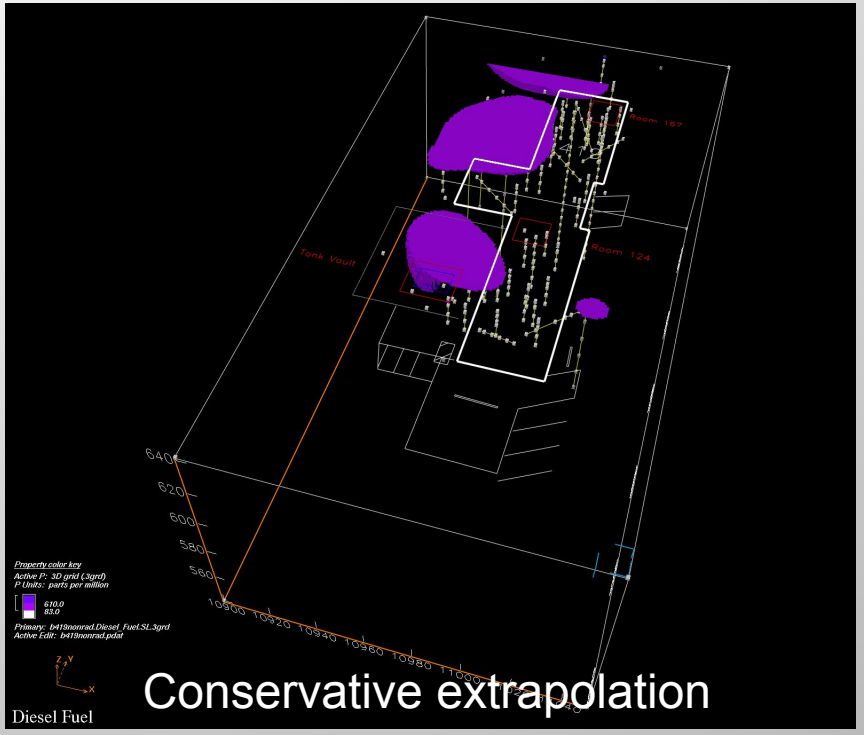


Cobalt
Residential ESL = 40 mg/kg

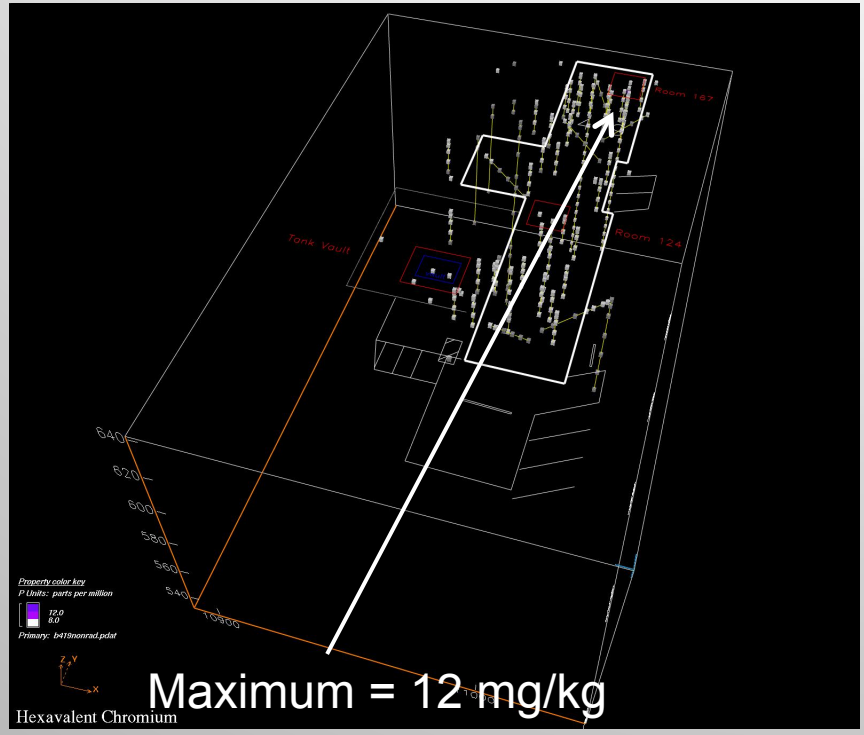


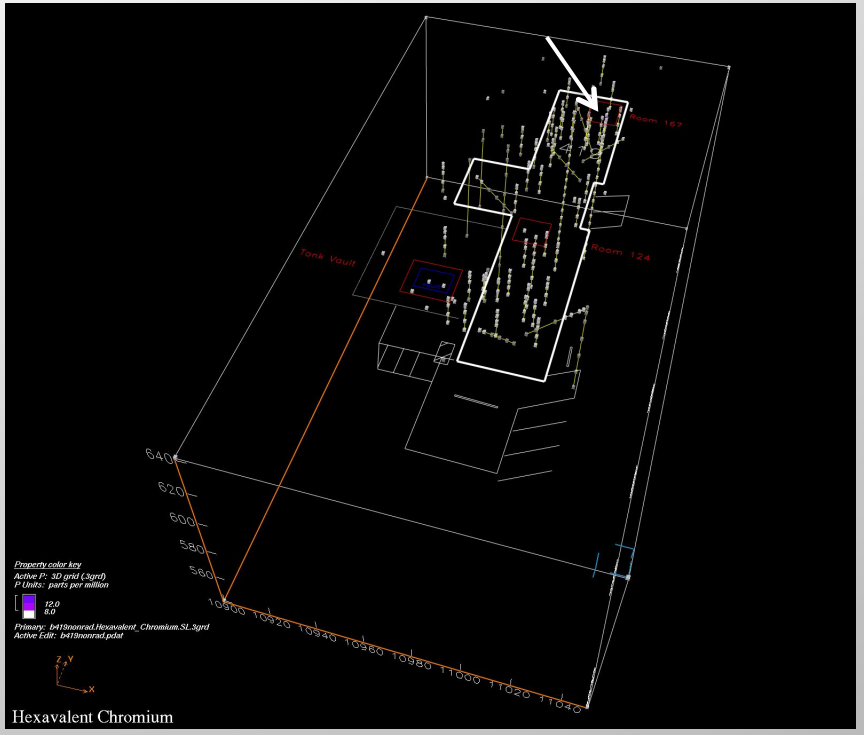
Diesel Fuel
Residential ESL = 83 mg/kg



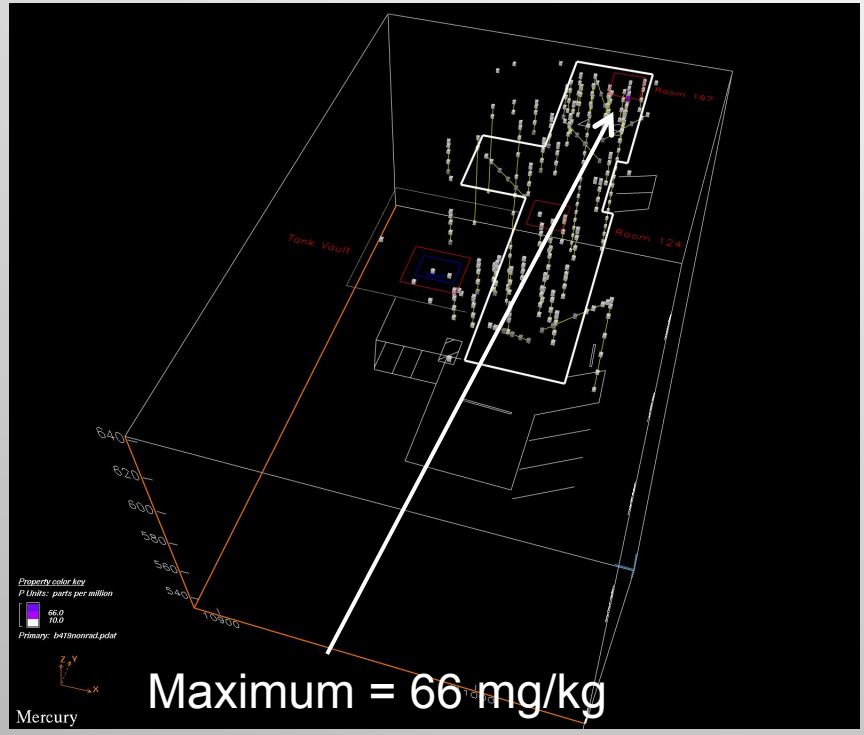


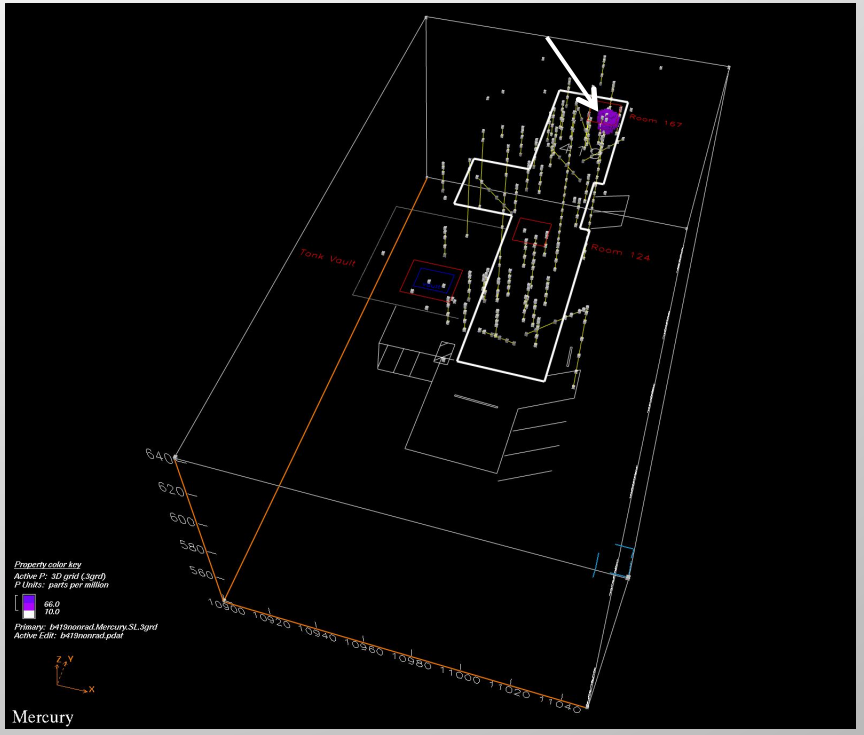
Hexavalent Chromium
Residential ESL = 8 mg/kg



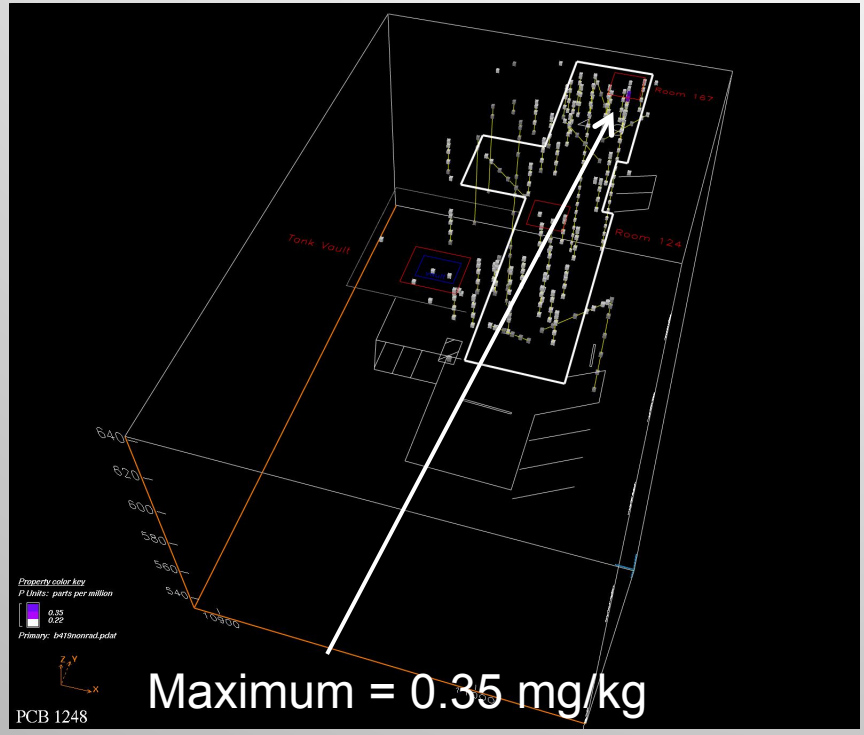


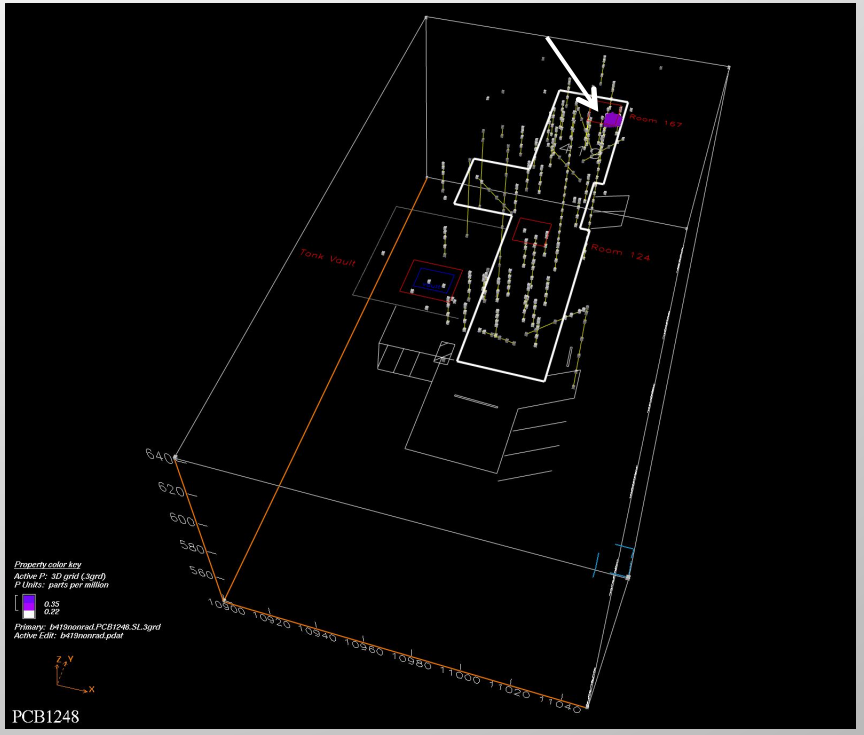
Mercury
Residential RSL = 10 mg/kg



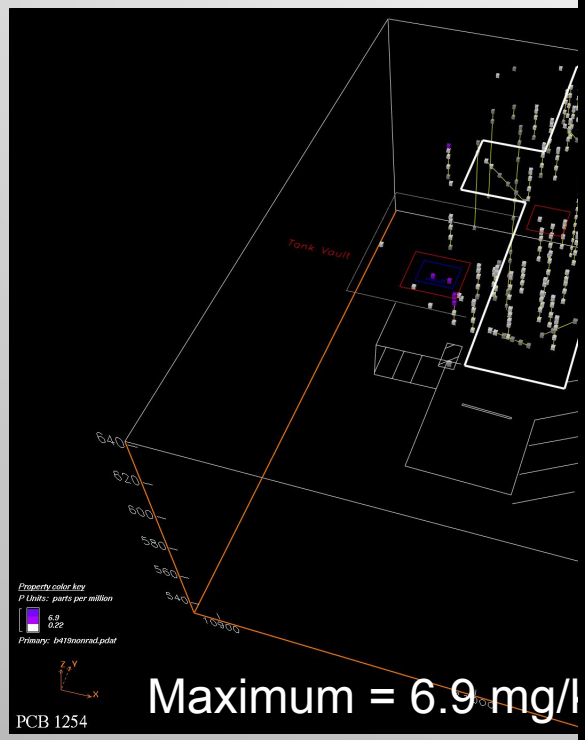


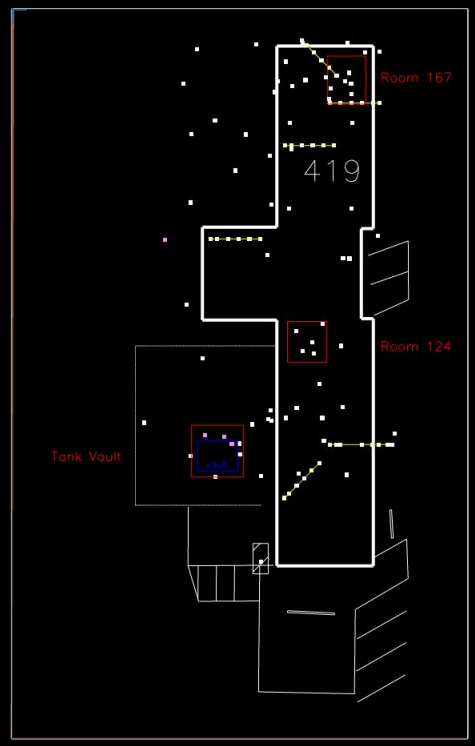
PCB 1248
Residential ESL = 0.22 mg/kg





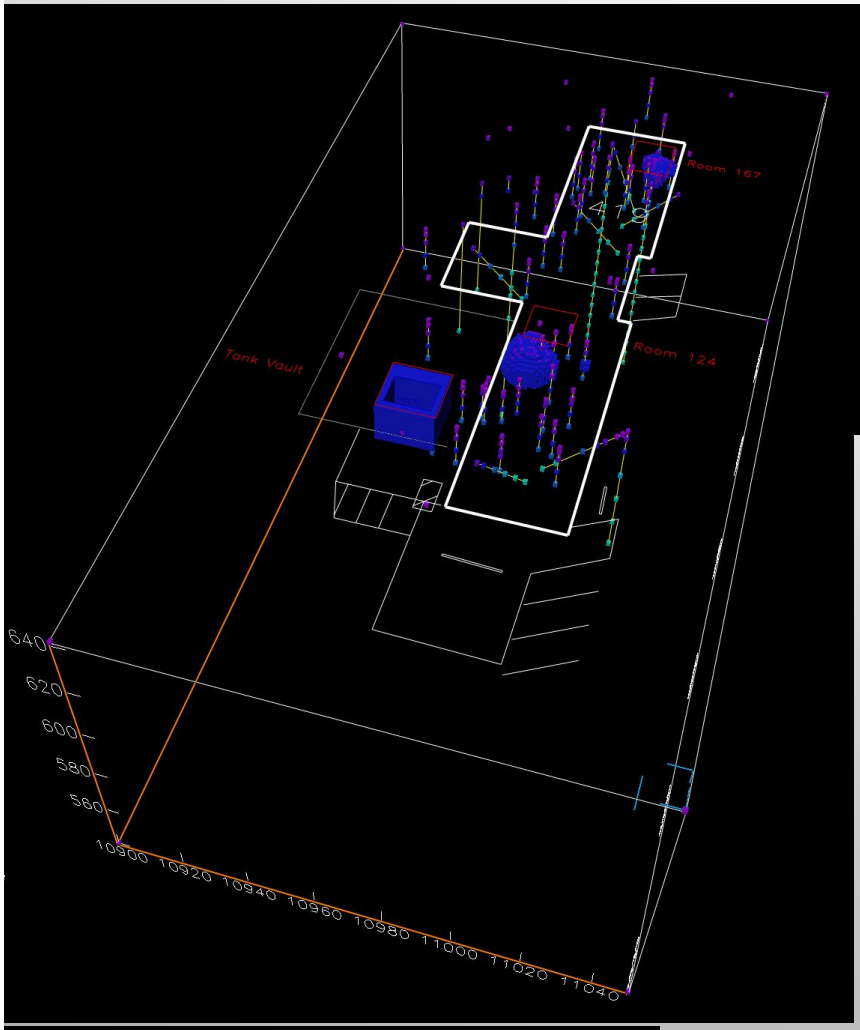
PCB 1254
Residential ESL = 0.22 mg/kg





Property color key
P Units: parts per million
6.9
0.22
Primary: b419nonrad.pdat
PCB 1254

All constituents of potential concern that are above their Residential Screening Levels



- Diesel Fuel is excluded

Results summary

- Identified 3 primary areas of concern associated with B419
  - Beneath northeast corner of room 167
  - Beneath northwest corner of room 124
  - Near tank vault
    - Constraining graphical plots of cobalt and PCB 1254 difficult due to sampling locations relative to few positive detects near vault walls
- None of the radioactive components exceed the current residential screening level guidance
  - The few locations where radioactive isotopes were detected below ESLs are within soil volumes with other COPCs
- Diesel hits sporadic near surface under paved areas outside of building

In addition to remaining slab and vault structure, removal of about 400 cu. yd. of material needed to achieve ‘clean closure’

- Beneath Room 167
  - ~ 90 cu.yd
- Beneath Room 124
  - ~ 110 cu.yd
- Surrounding Tank Vault
  - ~ 100 to 200 cu.yd

Recommended Path Forward

Recommended action to complete closure

- Removal of remaining slab and foundation materials, and targeted removal of contaminated soil

Backup Slides

- Livermore Site CERCLA Project overview
- Logic chart for interface with CERCLA and D&D projects with contaminated soil

Figure 1. Facility decontamination and decommissioning (D&D) process

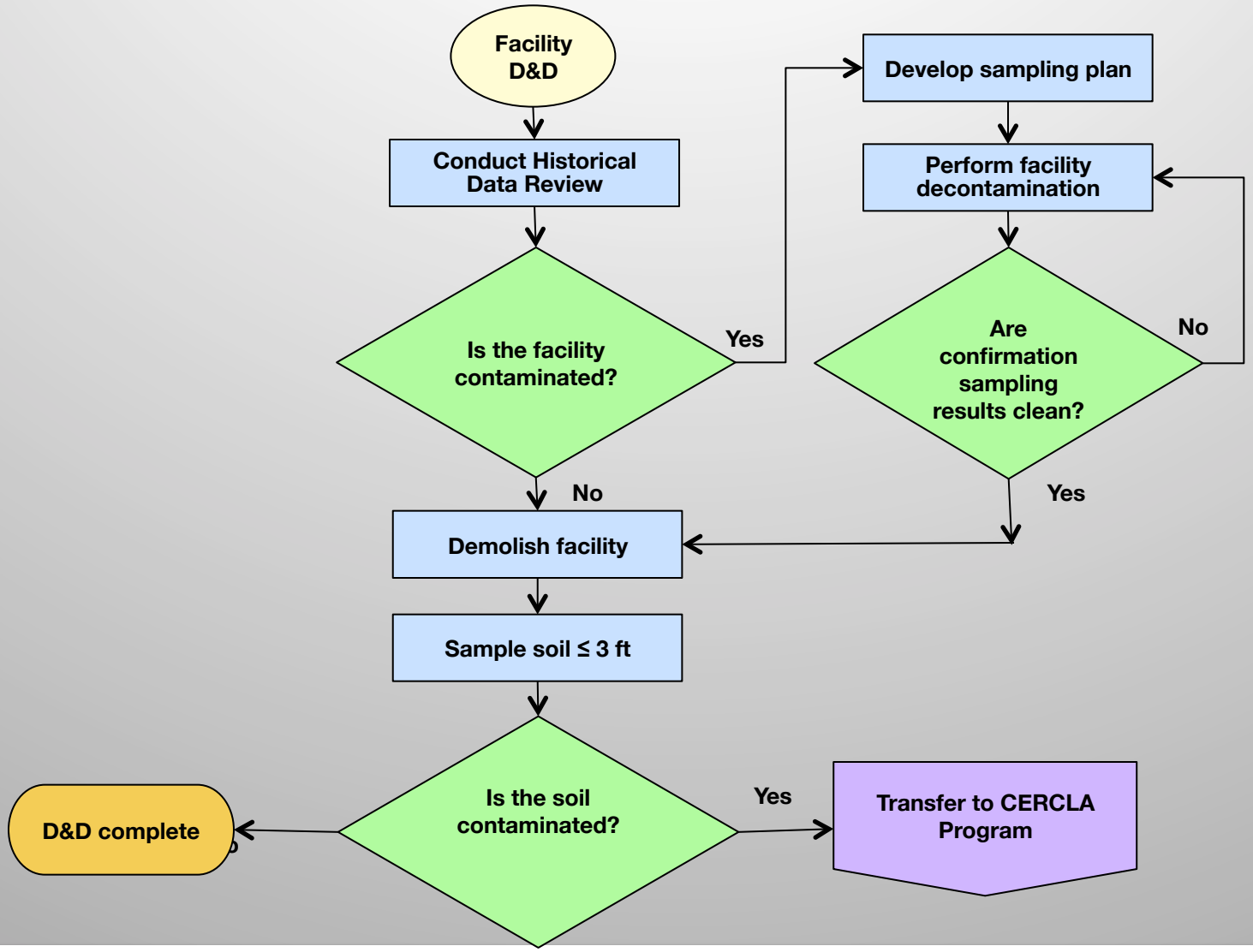
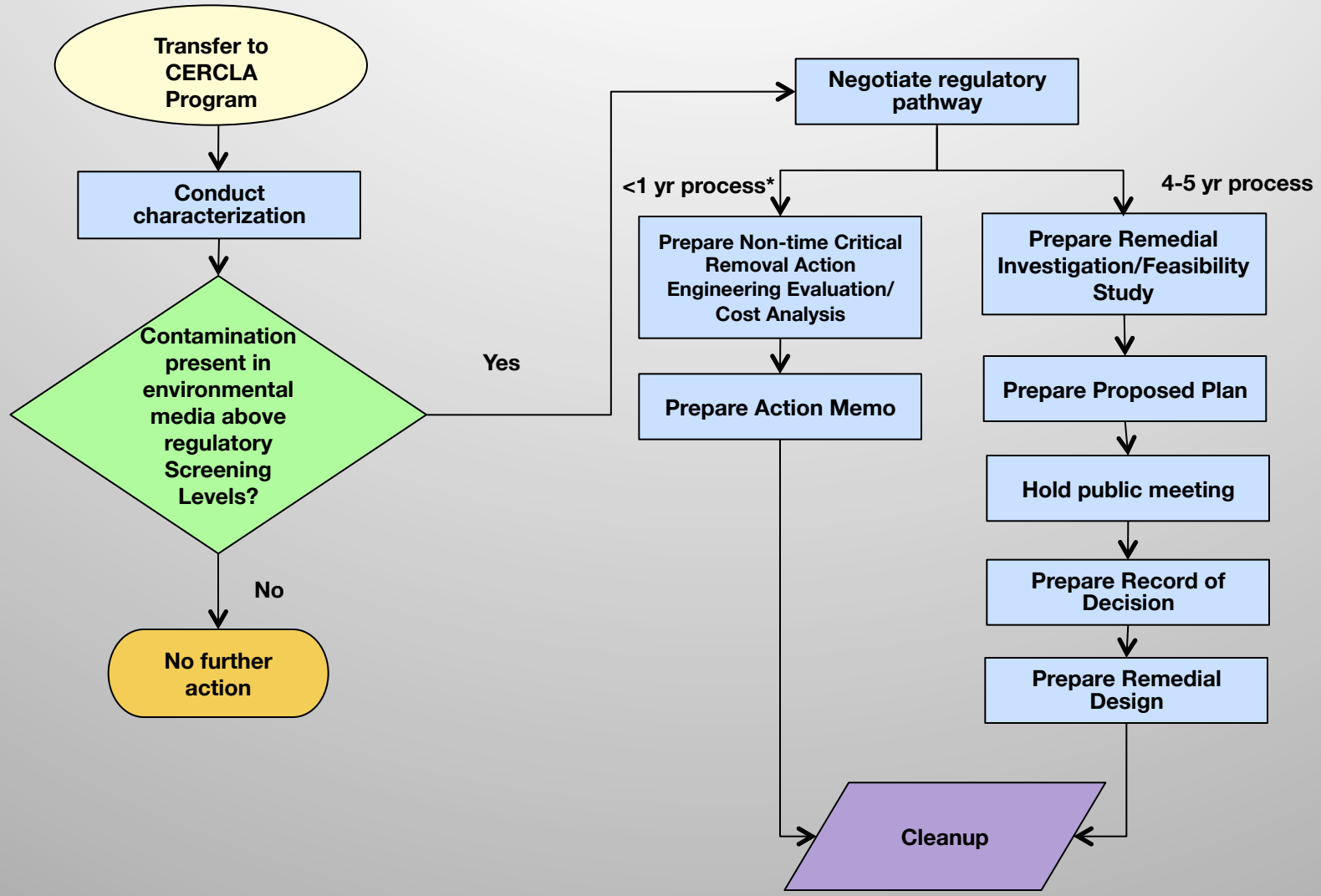


Figure 2. CERCLA process for environmental contamination identified following facility D&D



*Assumes draft, draft final, and final versions are not required.

Livermore Site CERCLA project - Background

- COCs include(d) volatile organic compounds (VOCs), fuel hydrocarbons, metals, tritium
- Primary VOCs are TCE and PCE
- VOC plumes extend both laterally and vertically beneath the site within multiple hydrostratigraphic units
- No Further Action for fuel hydrocarbon release site in 1996
- Chromium remains slightly above cleanup standard at one treatment location (TFC Southeast)
- Tritium below the MCL at all groundwater monitoring locations since 2004, however it is commingled with VOCs

The CERCLA Process

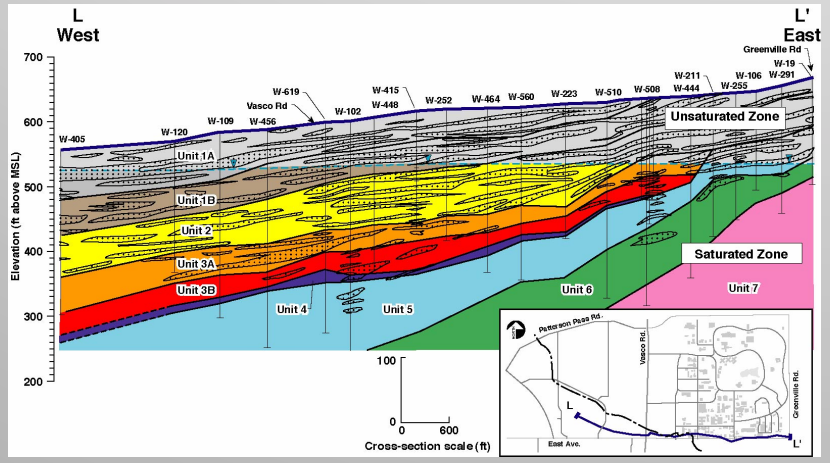
Chronology of Livermore Site CERCLA project

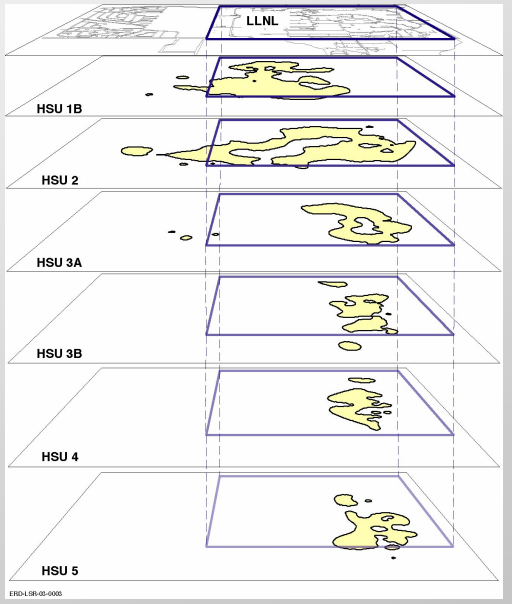
- U.S. Navy operated NAS Livermore during WWII (1940s)
- LLNL established in 1952
- Ground water contamination first discovered in 1983
- Site placed on U.S. EPA's National Priorities List in 1987
- Ground water remediation initiated in 1989
- Record of Decision signed in 1992
  - Approved remedy is pump-and-treat (GWE & SVE)
  - Cleanup standard = MCLs
  - MNA for tritium
- Fourth Five-year Review in progress

Small compact, portable treatment units are used in conjunction with larger, fixed treatment facilities

Ground Water Cleanup Priorities

- Western plume cleanup
- Southern plume cleanup
- Capture onsite distal plumes
- Source area control/cleanup

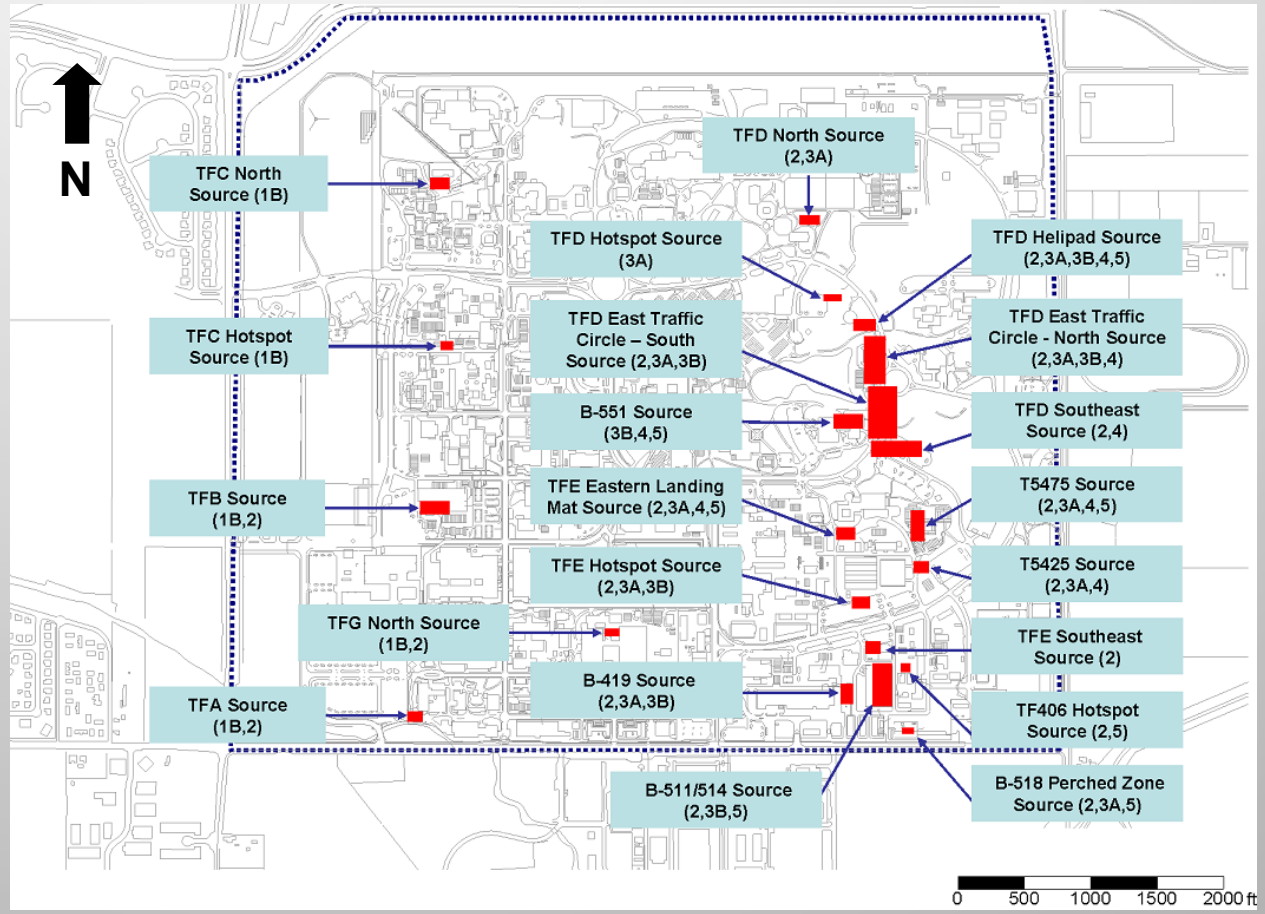




Cleanup priorities were determined in conjunction with stakeholders

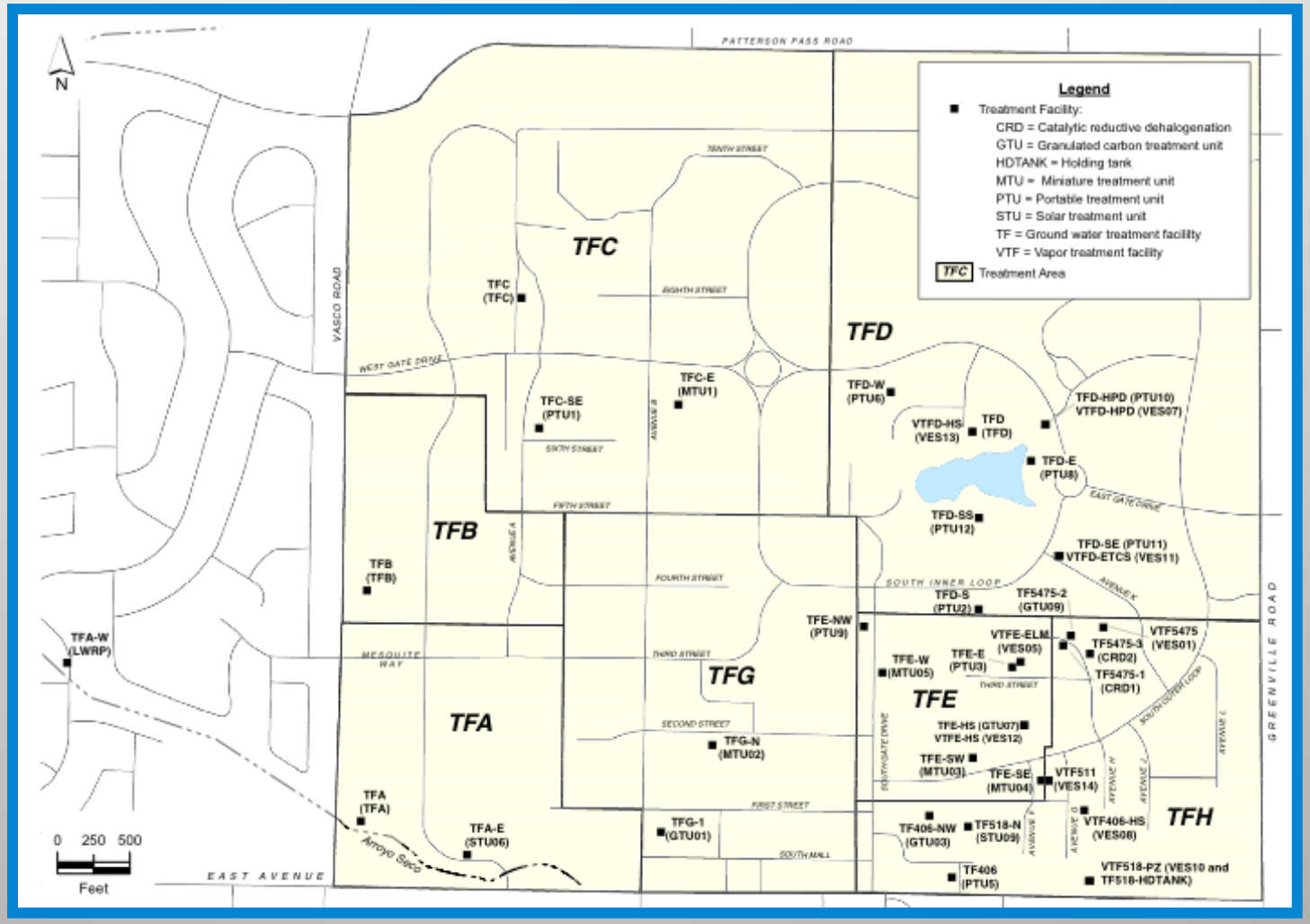
Source Areas at the Livermore Site

- 21 distinct source areas identified
  - Different hydraulic characteristics
  - Variable VOC distribution in ground water
  - Variable unsaturated zone influence
- Goal: reduce the environmental cleanup mortgage



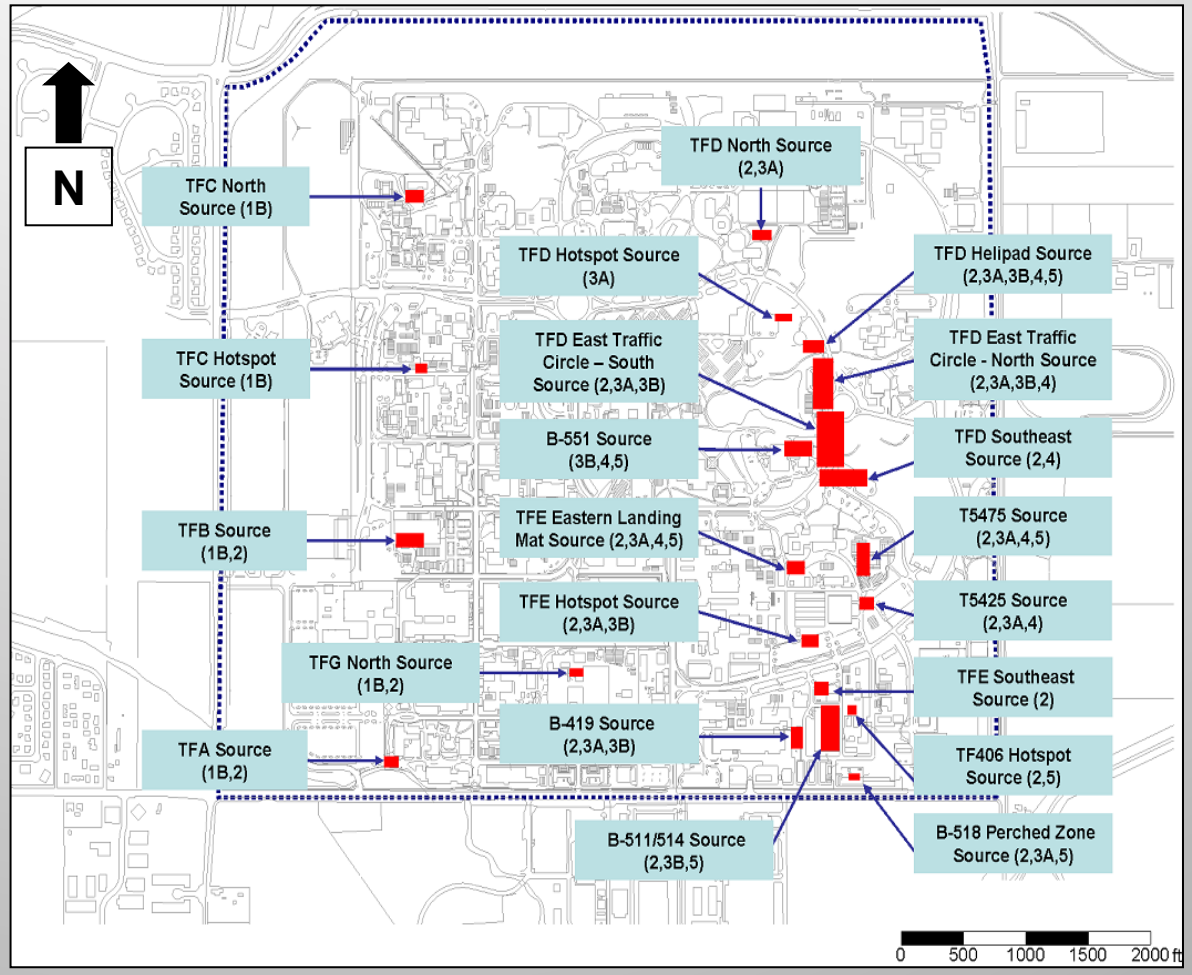
Treatment Facilities at LLNL

4 Fixed
10 PTUs
5 MTUs
4 GTUs
2 STUs
2 CRDs
1 Tank
9 VESs

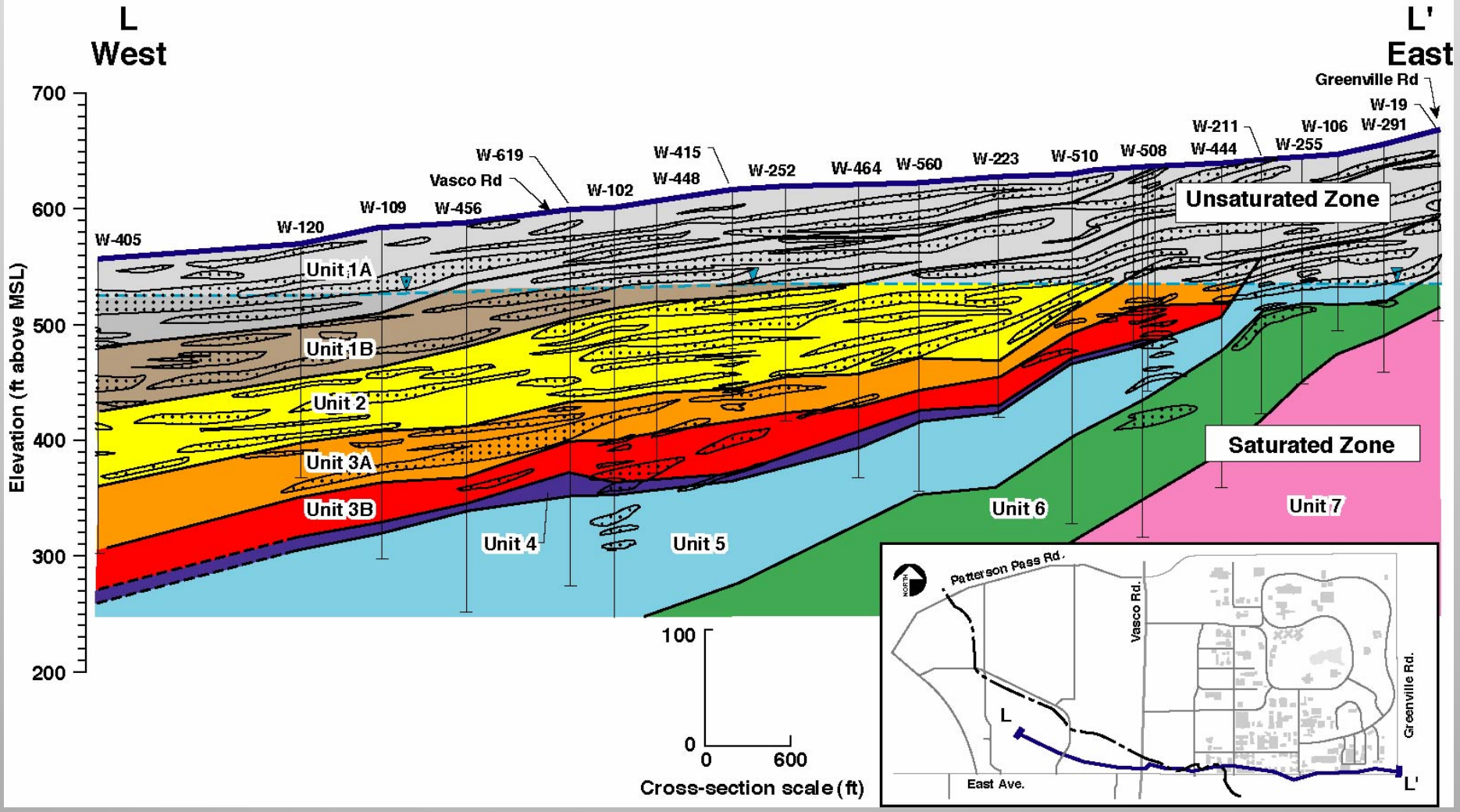


Source areas at the Livermore Site

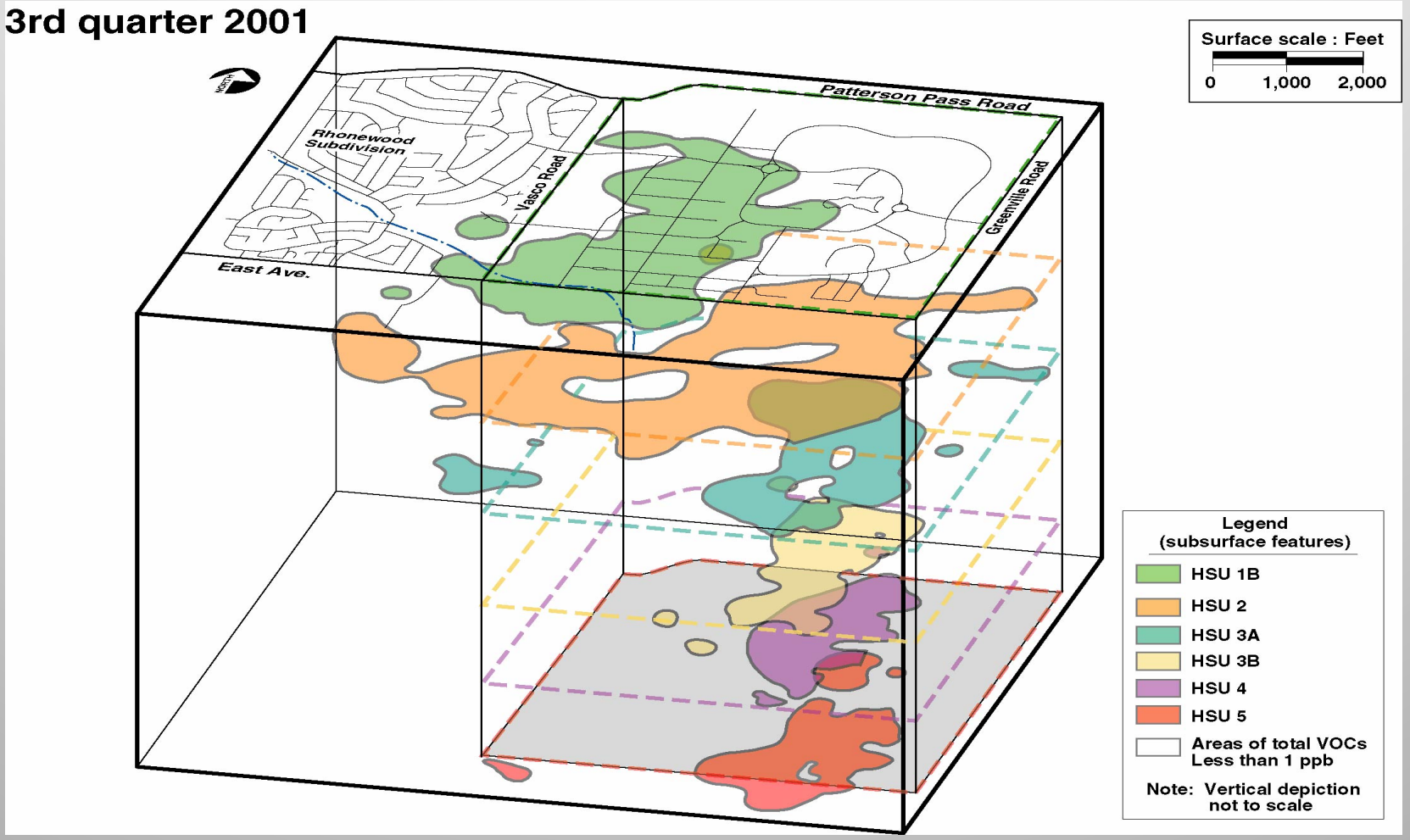
- 21 distinct source areas identified based on past activities and site characterization data:
  - Different hydraulic characteristics
  - Variable VOC distribution in ground water
  - Variable unsaturated zone influence



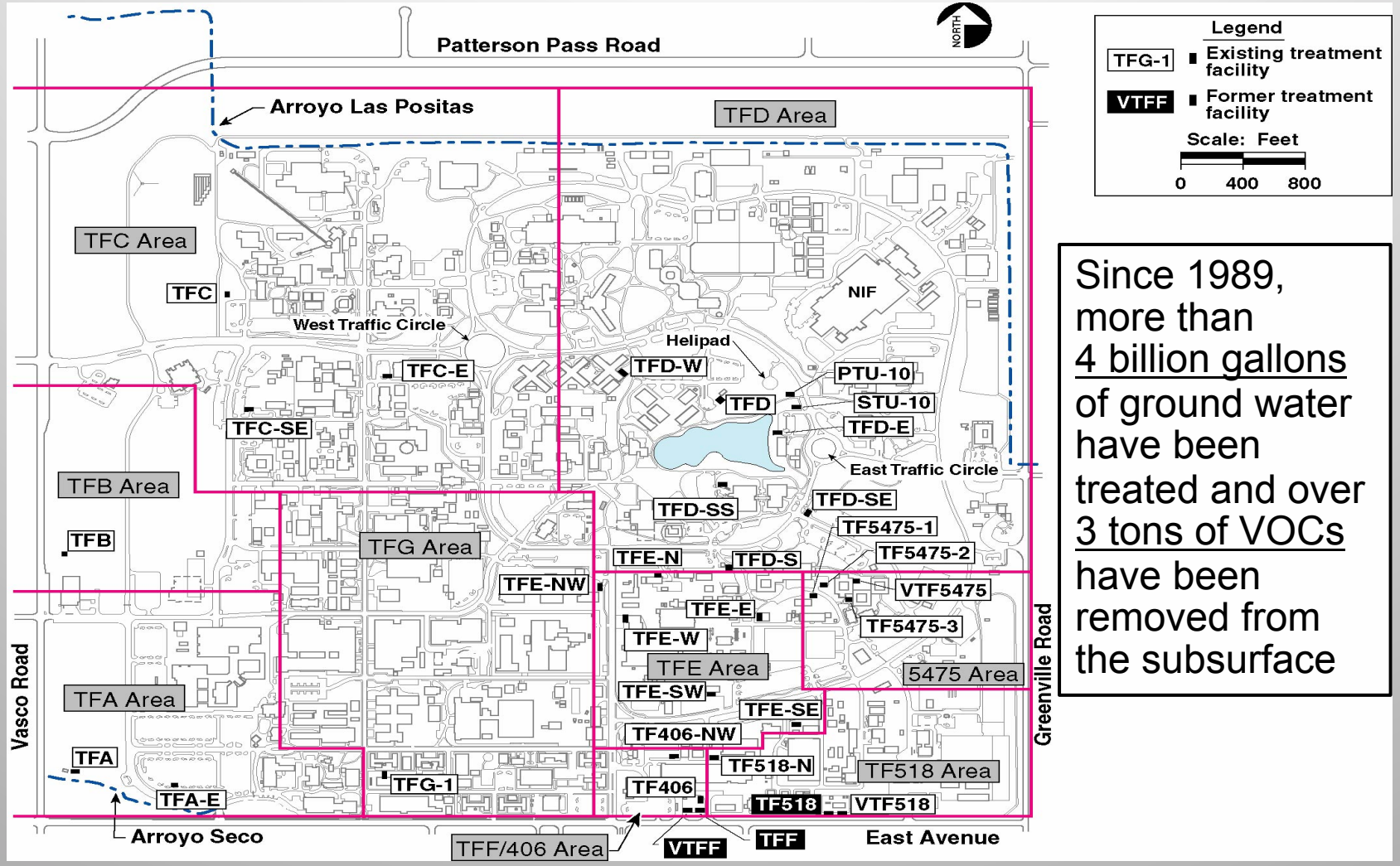
Alluvial fan sediments grouped into an HSU structure



Contaminants are distributed both horizontally and vertically beneath the Livermore Site

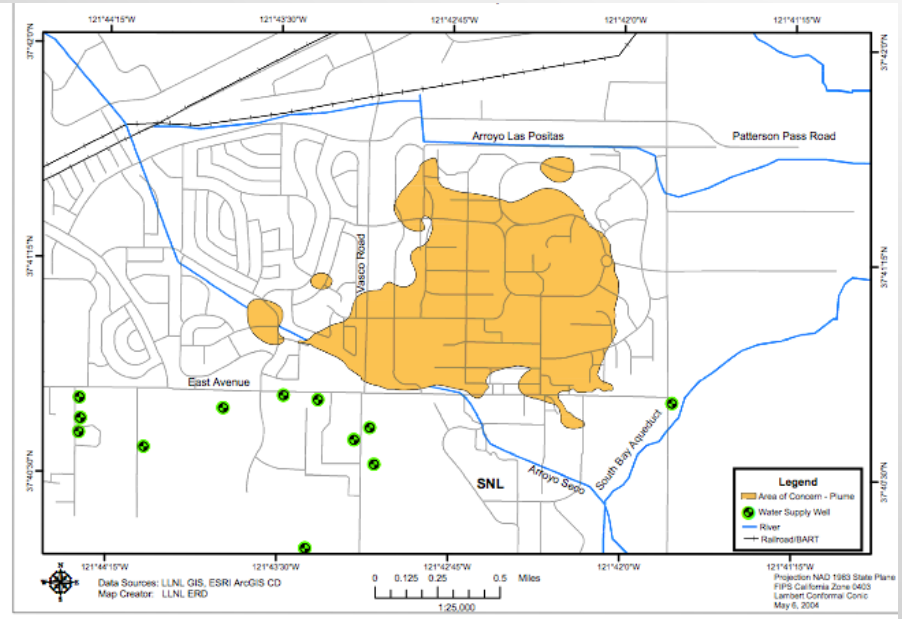


More than 900,000 gallons of ground water are treated daily at 28 treatment units



Since 1989, more than 4 billion gallons of ground water have been treated and over 3 tons of VOCs have been removed from the subsurface

Ground Water Contamination is addressed under CERCLA

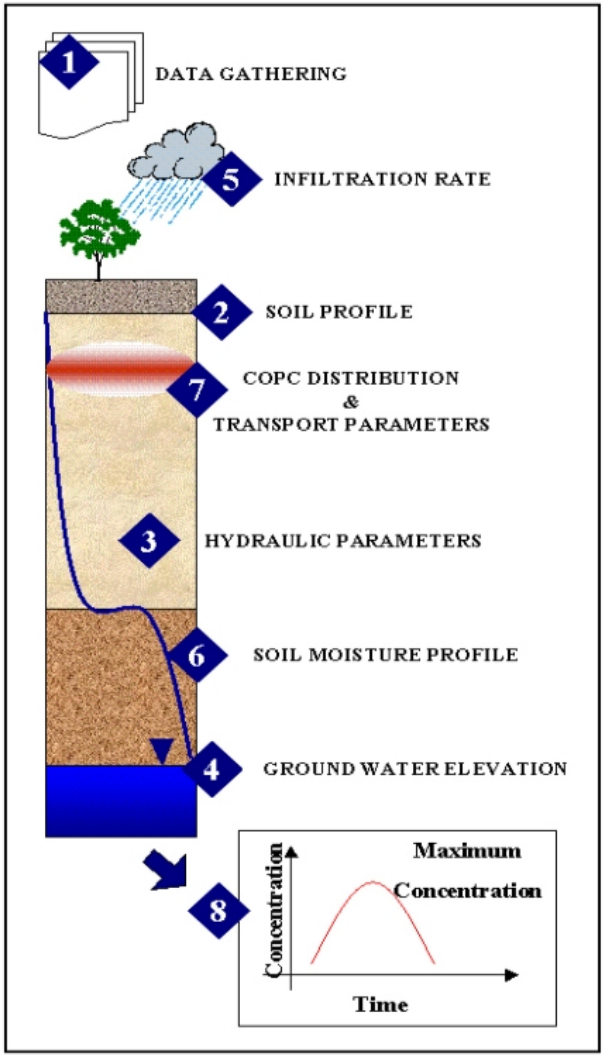


Livermore Naval Air Station

LLNL construction

- Contamination discovered in 1983
- Contaminants of Concern:
  VOCs, tritium, chromium
- Primary VOCs: trichloroethylene (TCE), perchloroethylene (PCE)
- Remediation operations began in 1989
- Constructed 37 treatment facilities (TFs)
  - 28 ground water TFs
  - 9 soil vapor TFs
  - 93 ground water extraction wells
  - 32 soil vapor extraction wells
  - 17 dual extraction wells
  - >400 monitor wells
- Results to date:
  - >4 billion gallons of ground water and >400 million cubic feet of vapor treated
  - Nearly 3,000 kg (>3 tons) of VOCs have been removed from the subsurface

Modeling potential impact to ground water

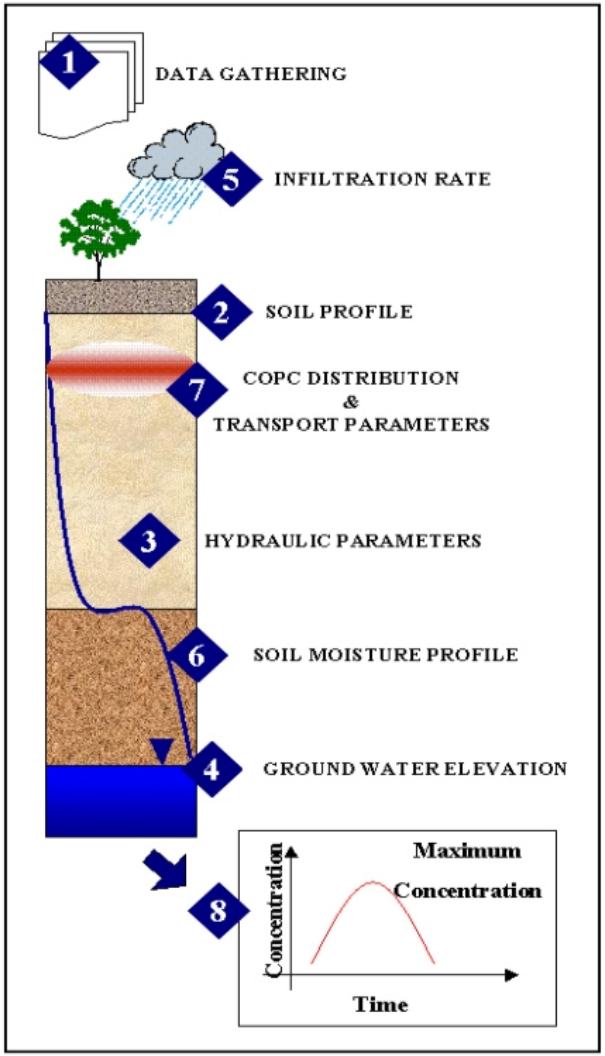


1. Data gathering: We used borehole lithological, geophysical, and ground water elevation data from all wells and boreholes near Building 419. We also gathered data on soil physical properties from across the entire LLNL site as well as regional precipitation and infiltration data.

2. Soil Profile: Using the above information we created a representative soil profile for Building 419 area. We used the most permeable soil type observed in any one of the borehole to develop a conservative soil profile.

3. Hydraulic Parameters: Since there aren't any unsaturated soil properties available directly from the Building 419 area, we categorized the observed soils into three lithological types as high permeability sands and gravels (HEK), medium permeability silty sands and silts (MEK), and low permeability silts and clays (LEK).

Modeling potential impact to ground water

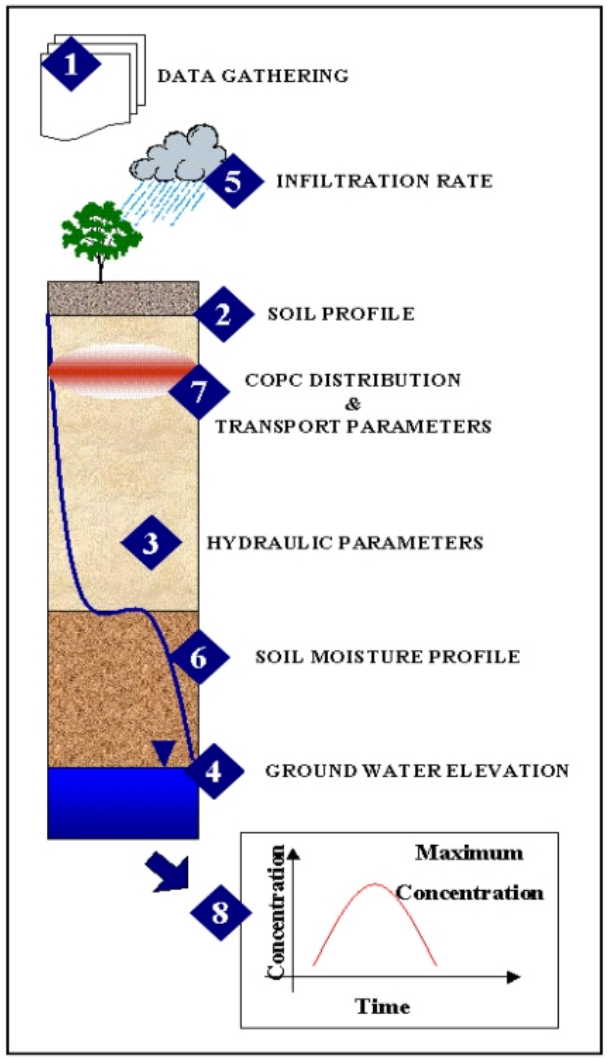


4. Ground Water Elevation: The highest ground water elevation observed beneath the Building 419 area is ~90 feet below ground.

5. Infiltration rate: Based on a simple net infiltration calculation and the infiltration rate used in a calibrated regional ground water flow model, we used a conservative infiltration rate of 1.2 inch/year. This value is equivalent to 10% of average annual precipitation at the site.

6. Soil Moisture Profile: Soil properties were conservatively selected to ensure a soil moisture profile that is continuous and at a higher moisture content than typically observed at the site. Existing soil moisture data was used to calibrate the unsaturated flow portion of the model.

Modeling potential impact to ground water



7. Contaminant of Potential Concern (CPOC) Distribution and Transport Parameters: CPOC specific transport parameters were used in each model. Dispersion and volatilization was ignored to preserve conservative transport properties. The first ten feet of the soil column was assumed to be contaminated at the maximum measured concentration for a given CPOC.

8. The model was run until the maximum concentration reaching ground water was observed. An EPA recommended Dilution Attenuation factor of 20 was applied at the water surface representing the concentration of water in a hypothetical drinking water supply well completed directly beneath the site.

Modeling results

Potential impact to ground water from chemicals detected in subsurface soils, Building 419 RCRA Closure.

Chemical of Potential Concern Concentrations exceed the: 1- Background soil (LLNL) values 2- EPA RSLs (RAD RSLs 2000) 3-Water board ESLs	Soil concentration used in the initial contaminant distribution (first 10 ft-bgs)	Maximum concentration reaching ground water (DAF=20)	Time to reach maximum concentration	Maximum Contaminant Limit - CA DHS MCL	Predicted time to reach MCL (years)	Potential COC
	mg/kg (Maximum)	ug/L	years	ug/L		
Arsenic	37	0.325	5.7 million	10	Does not exceed MCL	No
Barium	1000	30	1.7 million	1,000	Does not exceed MCL	No
Beryllium	40	0.24	4.5 million	4	Does not exceed MCL	No
Hexavalent Chromium	12	0.6	600,000	50	Does not exceed MCL	No
Cobalt	170	4.8	1.2 million	(4.7)	*Unregulated*	No
Mercury	66	10.85	200,000	2	75,000	Yes
Nickel	430	2.4	10 million	(100)	*Unregulated*	No
Vanadium	180	0.3	20 million	(78)	*Unregulated*	No
Benzo(b)fluoranthene (PAH)	0.42	0.0935	200,000	0.0002	20,000	Yes
Diesel Fuel	610	5250	7,500	(100000)	Does not exceed SNARL	No
PCB 1248	0.35	0.0000035	5 billion	0.0005	Does not exceed MCL	No
PCB 1254	6.9	0.00006	7 billion	0.0005	Does not exceed MCL	No

Environmental Functional Area

Environmental Support and Programmatic Outreach

LLNL-TR-573455

Response to DTSC's Comments on Closure Performance Standards and Remaining Closure Activities for the Building 419 Project at the Lawrence Livermore National Laboratory

August 2012

Lawrence Livermore National Laboratory

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

August 16, 2012

Mr. Ryan Batty, Project Manager
Engineering and Special Projects Office
Department of Toxic Substances Control
8800 Cal Center Drive, 2nd Floor
Sacramento, California 95826

Subject: **Response to DTSC's Comments on Closure Performance Standards and Remaining Closure Activities for the Building 419 Project at the Lawrence Livermore National Laboratory, Livermore, California; EPA ID No.: CA2890012584**

Dear Mr. Batty:

On May 22, 2012, the Lawrence Livermore National Laboratory (LLNL) provided the Department of Toxic Substances Control (DTSC) with a presentation on the Building 419 closure project that summarized completed and remaining closure activities, and described LLNL's recommended closure performance standards for the subsurface soil. DTSC provided LLNL with comments on the presentation through a formal written correspondence letter, dated June 12, 2012. The following responses have been prepared:

Comment 1-
"*Presentation Slide 10 – The slide shows composite sample locations used for concrete sampling. LLNL provided the results of the concrete sampling separately in an email dated June 6, 2012. DTSC requests additional information in order to clarify which sample results correspond to which locations. For example, we do not understand sample results identified as B-419-COMP-004A, B-419-R1500, and B-419-TVHS.*

DTSC requests that LLNL provide interpretation of the concrete results and indicate whether any concrete will be characterized as Resource Conservation and Recovery Act (RCRA) or California hazardous waste".

Response-
As DTSC is aware of, the concrete sampling plan consisted of five composite samples identified as B-419-COMP-01-0F, B-419-COMP-02-0F, B-419-COMP-03-0F, B-419-COMP-04-0F, and B-419-COMP-05-0F. Each composite sample area represents specific room numbers or sections of the project footprint, such as the north concrete pad, and tank vault. In addition to the composite sample areas, LLNL incorporated additional locations into the concrete sampling plan as follows:

a) An additional concrete sample, identified as B-419-R-167-W-0F, was collected from Room 167 in order to aid in the characterization of the concrete pad at Room 167 for

Recycle
7600-61230

disposal purposes. Elevated radiological activity levels were detected at this location on the concrete pad, so radiological isotopic speciation was performed on this sample.

b) B-419-COMP-004A was a composite sample from a concrete layer found in the subsurface one foot below grade. This composite sample was collected where Concrete, Asphalt, and Soil (CAS) sample numbers 23 and 33 are located.
c) The concrete sample, identified as B-419-014-4.5F, was collected from an additional layer of concrete that was found 4.5 feet below grade, at the location where CAS sample number 14 was collected.
d) The concrete layer of CAS sample number 21 is identified as B-419-021-0F. Radiological isotopic speciation was run on this sample in order to aide in the characterization of the concrete pad at Room 124 for disposal purposes.
e) An additional concrete sample, identified as B-419-TVHS-0F, was collected from the floor of the tank vault in order to aide in the characterization of the concrete vault for disposal purposes. Elevated radiological activity levels were detected at this location on the vault floor, so radiological isotopic speciation was performed on this sample. The acronym "TVHS" was given to this sample to represent, "Tank Vault Hot Spot".
f) An additional sample of the concrete pad from Room 1500 (previously utilized as a Battery Shop), was added to the concrete sampling plan because concrete samples from this room were not part of the original sampling plan, and LLNL needed a sample from this room to characterize this portion of the pad.

LLNL has determined, based on the following reasons, that the concrete pad that was associated with the facility structure, will be managed as low-level radioactive waste. None of the chemical constituents were found at hazardous waste levels, and the following considerations were taken into account for volatile organic compounds when LLNL made hazardous waste F-listing characterization determinations for the concrete pad:

a) The B-419 Closure Plan states that Rooms 155 and 167 are to be managed as mixed waste, but the Building 419 structure does NOT include the concrete slab floor of the building footprint, and that further characterization sampling and analysis for these areas will occur.
b) Methylene Chloride was the only volatile organic compound (VOC) found in the concrete pad,
c) Methylene Chloride was not used for degreasing purposes within Building 419,
d) Methylene Chloride was detected in all concrete pad method blanks, and was detected in the sample results at similar concentrations,
e) The offsite analytical laboratory that analyzed the concrete samples indicated that Methylene Chloride is used in their laboratory on a regular basis, and is used for extractions, so it is likely to be a lab contaminant, and

As stated in the B-419 Closure Plan, the concrete tank vault will be managed as mixed waste. Trichloroethylene (TCE) was detected in soil at locations beneath Room 167 where broken piping had previously been removed in the mid 1990's. TCE was used for its solvent purposes when the facility was used for RCRA operations, and LLNL personnel who worked in the

facility reported spills within the tank vault, where the piping was routed from Room 167. Therefore, the F002 hazardous waste listing will be applied to the concrete tank vault.

Comment 2-

"*Presentation Slide 15 – The slide indicates that Regional Screening Levels (RSLs) published by the U.S. Environmental Protection Agency (EPA) , Region 9, and Environmental Screening Level (ESLs) published by the Regional Water Quality Control Board, Region 2, were utilized as project soil screening levels. DTSC accepts RSLs as screening levels subject to the limitations stated in DTSC Human Health Risk Assessment (HHRA) Note 3 (See Link: http://www.dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-3.pdf). As indicated in HHRA Note 3, DTSC recommends 80 mg/kg (site wide 95 UCL, excluding hot-spots) as an unrestricted use screening level for lead*

If multiple constituents are present at concentrations at or near the respective screening level then an evaluation of cumulate impacts may be necessary. DTSC requests that LLNL comment on whether you believe an evaluation of cumulative impacts is necessary".

Response-

Please refer to the response for comment No. 3 below.

Comment 3-

"*Presentation Slide 16 – The slide indicates that LLNL screened against the higher of the RSL or the ESL. A screening level evaluation, by its nature, should be conservative and the lower of the available screening levels should be utilized. It is acceptable to DTSC if LLNL only relies on the ESL as a screening level if it is based on the protection of groundwater. The RSLs, as modified by HHRA Note 3, are sufficient for the protection of human health.*

DTSC requests that LLNL summarize the input data and key assumptions used in the groundwater modeling. DTSC also requests that LLNL address leaching of volatile organic compounds (VOCs) and lead to groundwater".

Response to Comments 2 and 3-

LLNL will use RSLs and incorporate the limitations stated in DTSC HHRA Note 3 to all screening level evaluations. LLNL initially decided to use ESLs when an RSL was not available and used the higher of the two values – mainly the ESL value – because the ESLs were based on screening levels that were specifically developed for the San Francisco – Bay Area. LLNL appreciates the assistance provided by DTSC regarding RSLs (i.e. identifying RSLs for polychlorinated biphenyls – PCBs) and the overall guidance provided for the screening level analysis. Upon further discussions with DTSC, LLNL used the lower value for the screening level analysis when there was more than one screening level that was applicable.

Lead - LLNL followed the guidance provided in HHRA Note 3 for lead, and determined that the 95 percent upper confidence level (95 UCL) for lead concentrations in soil is 20.2 mg/kg, which is below the 80 mg/kg 95 UCL level set in HHRA Note 3 for residential use. Therefore, lead is not considered a potential contaminant of concern (PCOC). In addition, once the soil removal

proposed by LLNL is complete, the remaining soil will have a 95 UCL soil concentration of 1.0 mg/kg for lead.

Polycyclic Aromatic Hydrocarbons (PAHs) – LLNL initially determined that the maximum benzo(b)fluoranthene (a PAH) concentration in soil is 0.42 mg/kg, and is above the RSL of 0.15 mg/kg for residential use. LLNL followed the advisory document by HHRA that defines soil background values for PAHs in Northern California. The background value is defined in equivalency concentration and is 0.4 mg/kg in benzo(a)pyrene-equivalency. When the maximum concentration of benzo(b)fluoranthene, 0.42 mg/kg is converted, the value is 0.042 mg/kg in benzo(a)pyrene-equivalency. This value (0.042 mg/kg) is below the background value of 0.4 mg/kg, therefore benzo(b)fluorathene is not considered a PCOC.

We also followed the guidance provided in HHRA Note 3 for determining the screening levels for thallium and vanadium. In addition, we used screening levels suggested by DTSC for cobalt and arsenic. For cobalt we used the California Human Health Screening Level (CHHSL) and for arsenic we used the regional background value determined by San Francisco Regional Water Quality Control Board study. All of the detections for diesel fuel and hydrocarbon fingerprint was in shallow soil (<1 ft) and was outside of the Building 419 footprint. These detections are presumed to be associated with equipment and vehicles used in paved areas and parking lots around the building, as well as the routine paving maintenance (e.g., slurry seals).

Table 1 lists the values used for the screening analysis based on DTSC's recommendations for PCOCs. The remaining constituents were either not detected or detected below their screening levels and are not included in Table 1. All locations where the PCOC exceed the screening level are included in the proposed volumes for soil removal.
LLNL has reviewed all the analytes and their respective screening levels. Based on the background values in soil and the difference between the maximum soil concentration and the RSLs for most analytes, LLNL believes that an evaluation of the cumulative impacts is not necessary, as the proposed areas of soil removal will capture the volumes of contaminants that would pose a threat when added together. Remaining concentrations are scattered more widely and overall are well below their respective RSL.

Table 1. Site background, screening level, and maximum soil concentrations for potential chemicals of concern at Building 419.

Constituent	Units	Maximum detected concentration	LLNL background	EPA residential RSL	Other screening levels	Selected screening level
Arsenic	mg/kg	37	7.59	0.39	11[a]	11
Chromium	mg/kg	300	48.9	-	-	48.9
Hexavalent Chromium	mg/kg	12	2.2	0.29	-	2.2
Mercury	mg/kg	66	0.0759	10	-	10
Vanadium	mg/kg	180	43.7	390	78[b]	390
Diesel Fuel	mg/kg	610[c]	-	-	-	-
Gasoline fingerprint	mg/kg	1.2[c]	-	-	-	-
PCB 1248	mg/kg	0.35	-	0.22	-	0.22
PCB 1254	mg/kg	6.9	-	0.22	-	0.22
Americium 241	pCi/g	150	0.062	1.8	-	1.8
Cobalt 56	pCi/g	1.12	0.428	0.651	-	0.651
Gross alpha	pCi/g	262	3.38	-	-	3.38
Gross beta	pCi/g	28.1	4.47	-	-	4.47
Plutonium 239+240	pCi/g	32.2	0.046	2.58	-	2.58
Strontium 90	pCi/g	1.15	0.264	0.344	-	0.344
Tritium	pCi/g	1920	0.106	0.882	110[d]	110
Uranium 234 and Uranium 233	pCi/g	18.4	0.76	3.86	-	3.86
Uranium 235 and Uranium 236	pCi/g	1.39	0.0904	0.192	-	0.192
Uranium 238	pCi/g	46	0.717	4.48	-	4.48

[a] Regional background is 11 mg/kg by San Francisco Regional Water Quality Control Board
[b] DTSC HHRA Note 3 (value has been updated to the EPA RSL of 390)
[c] Detected in shallow (<1 ft) soil outside the building footprint mostly in paved parking lots
[d] DOE Order 458.1 and Federal Register Volume 64.68396

LLNL has also conducted a tiered analysis of the potential impact to ground water from residual contamination at Building 419. The first tier included a comparison of the maximum concentration in soil to the RSL for protection of groundwater. Several of the constituents exceeded the RSL. These constituents are arsenic, barium, beryllium, hexavalent chromium, cobalt, mercury, nickel, vanadium, PCB 1248, PCB 1254, and benzo(b)fluoranthene (PAH). In addition, radionuclides americium 241, plutonium 239+240, strontium90, thorium 234, uranium 234+233, and uranium 238 also exceeded their respective RSLs.

Most of the soil with PCOC concentrations exceeding the RSL for protection of ground water will be removed as part of the proposed soil removal. However, LLNL used a flow and transport model with conservative input parameters to conduct a second tier analysis where site-specific values were incorporated to assess potential impact to ground water before any removal action. The results of this analysis show that only mercury and benzo(b)fluoranthene may potentially impact ground water given a very long time period (200,000 years). The soil volumes with the concentrations of mercury and benzo(b)fluoranthene that may potentially impact ground water are included in the proposed volume of soil for removal, therefore should not pose any risk to ground water in the future.

The next section discusses a summary of the key assumptions and input data as requested by DTSC.

LLNL has been using the numerical code NUFT (Non-isothermal, Unsaturated-Saturated Flow and Transport) for similar screening level analysis. NUFT (Nitao, 1998) is a multi-phase, multi-component flow and transport code that was primarily developed to simulate flow and transport in the unsaturated zone. NUFT is capable of simulating all essential unsaturated and saturated zone processes including advection, dispersion, diffusion, adsorption, volatilization, and degradation for aqueous, gaseous and non-aqueous phases under non-isothermal conditions. NUFT has also been used for the same screening level and risk assessment purposes at other locations at LLNL's Livermore Site and Site 300, and at the LEHR site in Davis, California.

The general modeling approach is comprised of eight steps:

Step 1. Gather all available surface and subsurface data for the source area.

Step 2. Develop a representative soil profile based on site borehole lithologic and geophysical data.

Step 3. Assign unsaturated flow properties for each soil type.

Step 4. Determine the highest elevation of the ground water table at the bottom of the column.

Step 5. Assign a conservative infiltration rate at the top of the column.

Step 6. Calibrate the flow model until a representative soil moisture profile is obtained.

Step 7. Assign the initial concentration distribution along the soil profile for each chemical.

Step 8. Using the transport model determine the maximum concentration/activity reaching the ground water and define the distribution of concentration/activity along the soil profile.

Model input parameters are determined by using multiple data sets collected from at or near Building 419. Boring logs, geophysical logs, and information from shallow borings are used to characterize the geology and develop representative soil profile. Long-term ground water elevation data from nearby wells are used to determine the highest ground water elevation observed beneath the site. A combination of laboratory analysis data, literature data for soil physical parameters and unsaturated flow parameters are used as model input for each soil type present. Meteorological data from LLNL Livermore Site and Sandia Laboratory weather stations are used in determining the infiltration rate.

Soil profile: A representative soil profile was developed for Building 419 based on geological and geophysical information from nearby wells W-210, W-2204, W-2205, and W-2206. Discontinuous layers of low permeability units with fine soils were disregarded. The maximum encountered thickness of high permeability layers, and minimum encountered thickness of adjacent low permeability units were used in developing a conservative soil profile from an unsaturated flow and transport perspective.

Soil properties: The geological units beneath Building 419 can be divided into several general soil types. These types are based on borehole sample lithology descriptions, and geophysical data. The lithologic samples from each borehole were grouped into three soil types: 1) High hydraulic conductivity soils (gravel, sand), 2) Medium hydraulic conductivity soils (silty sand, silts), and 3) Low hydraulic conductivity soils (clayey silts, clays).

For each of the three soil types, NUFT input parameters were based on the laboratory analysis results and data from literature surveys. The moisture retention curve of each soil type was defined using the Van Genuchten (1980) model parameters. Care was taken to conservatively select higher permeability, porosity and moisture retention parameter values. The resulting soil profiles are more saturated and more permeable than what is generally observed in the field, therefore contaminant migration occurs at a faster rate and at higher concentrations. This approach is specifically used to account for processes such as fingering and localized heterogeneity. Soil moisture profiles resulting from these sets of input parameters conservatively represent typical conditions for a rainy season.

Ground water elevation and the unsaturated zone thickness: Long-term hydrographs from nearby wells completed in the uppermost water-bearing zone were examined and the highest historical ground water elevations were used in the model as the location for the potential receptor (ground water).

Infiltration rate: A water balance analysis was conducted to determine an average infiltration rate for the entire site. The Green and Ampt (1911) model to predict net infiltration was used as the basis of the analysis. In addition, time-dependent rainfall data was incorporated into the analysis using the Chu (1978) model. Based on this analysis we used an infiltration rate that is equal to 10% of the total precipitation on site. This rate is identical to the rate used for the calibrated

regional-scale ground water model.

Transport parameters: The transport parameters required in NUFT include physical properties, partitioning coefficients, decay rates, diffusion, and dispersivity constants for chemicals. Physical properties of chemicals such as molecular weight or half-life are readily available in the literature. Partitioning coefficients between the solid, air and water phases are well studied and exist in large databases for various chemicals with a range of reported values. The lowest published values for soil-water partitioning coefficients are selected for this analysis resulting in less sorptive (more mobile) transport behavior. Volatilization of organic compounds is not allowed by using a water-air partitioning coefficient ensuring that mass remains in the water phase. None of the chemicals are assigned a degradation rate. Dispersion was conservatively assumed to be negligible in the vadose zone. As vadose zone contaminants enter the saturated zone, dilution occurs since percolating vadose zone water combines with laterally flowing ambient groundwater from the up-gradient direction. A dilution factor can be estimated by taking the ratio of lateral ground water seepage to the vertical vadose zone seepage determined by the infiltration rate. An EPA recommended dilution attenuation factor of 20 is used in the models.

Potential impact to ground water from residual VOC concentration: Please refer to the response to DTSC comment No 4.

A separate screening level model was run to evaluate the potential impact to ground water from the residual lead concentration in soil beneath Building 419. Based on the modeling using the same approach described above, the maximum measured lead concentration of 330 mg/kg did not impact ground water above the drinking water standard of 15 ug/L. In addition, soil with residual concentrations above 200 mg/kg will be removed during excavation. The current ESL for protection of groundwater is 200 mg/kg.

Comment 4-
"*Presentation Slide 17 – The slide indicates that VOCs were excluded from the evaluation because Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) remediation is ongoing. DTSC does not agree to change the closure plan to exclude VOCs."*

Response-
Analysis of all the soil samples collected beneath Building 419 shows that there were five volatile organic compounds (VOCs) that were measured above their detection limits. Table 2 shows the detected VOCs, the maximum concentration measured at Building 419, and applicable screening levels. The RSL for human health includes the vapor inhalation pathway. The maximum concentrations of VOCs are below their respective RSLs for the protection of human health. Maximum concentrations of VOCs in soil exceed the RSLs for protection of ground water, however most of these results are from soil samples collected at depths between 75 to 95 feet below ground surface (ft-bgs). The water table is currently fluctuating between 100 to 110 ft-bgs and is contaminated by VOCs originating from upgradient sources.

For comparison the SF RWQCB ESLs for the protection of ground water (residential land use, <3 meter bgs) are included in Table 2. 1,2-Dichloroethane is the only VOC that exceeds the ESL and all samples exceeding the ESL are collected from 70 to 95 ft-bgs.
In addition, LLNL performed a screening level evaluation of the potential VOC impact to ground water using a flow and transport model, and conservative site-specific model parameters. The results of this evaluation indicate that the residual VOC concentrations in the top 15 ft of the soil column will not impact the ground water above drinking water standards. Please keep in mind that the ground water beneath Building 419 is already contaminated with VOCs at levels higher than what the residual concentration in the vadose zone can potentially impact ground water.

The ground water beneath Building 419 is contaminated with VOCs that are mostly originating from upgradient sources. LLNL is addressing this contamination under the CERCLA program. As part of the CERCLA program, LLNL operated three vapor extraction wells on the north side of Building 419 (W-2204, W-2205, and W-2206). Soil vapor extraction was performed from September 2006 to October 2007 and the VOC concentrations in soil vapor were reduced by an order of magnitude. For example, in well W-2204 the TCE concentration was reduced from 45 ppm(v/v) to 5.1 ppm(v/v) and has remained at the same level since then. These wells are screened from 40 to 120 ft-bgs and address the VOC concentration at depth. The site is currently part of a 'Focused Feasibility Study' to determine the best course of action into the future. The objective of the study is to minimize mixed waste generation due to the presence of tritium. As required by the Record of Decision, the remedial goals of the CERCLA program are to continue ground water remediation until drinking water standards (MCLs) are achieved and continue soil vapor remediation until the concentrations in the vadose zone are reduced below levels where there isn't any potential impact to ground water above the MCLs. These goals are in line with substantive requirements of RCRA closure.

Since the maximum concentration of VOCs beneath Building 419 are below their respective RSLs and since the CERCLA program will continue to remediate the ground water beneath the site, LLNL believes that VOCs do not require further action under the RCRA program.

Table 2. Volatile organic compounds detected at Building 419 and their screening levels.

Volatile Organic Compound	**Maximum detected concentration in soil (mg/kg)**	**EPA Regional Screening Level (mg/kg)**	**EPA Regional Screening Level for protection of ground water (mg/kg)**	**SF RWQCB Environmental Screening Level for protection of ground water (mg/kg)**
1,2-Dichloroethane	0.067	0.43	0.0014	**0.0045**
Carbon tetrachloride	0.009	0.61	0.0019	0.11
Methylene chloride	0.015	11	0.0013	0.077
Tetrachloroethene	0.0095	0.55	0.0023	0.7
Trichloroethene	0.43	0.91	0.0018	0.46

Comment 5-
"*Presentation Slides 31 and 33 – The slides indicate the limits of the proposed soil excavations. The excavations below rooms 124 and 167 seem disproportionate to the sample data. For example, LLNL is relying on a single elevated detection of arsenic as the basis for the excavation of approximately 110 cubic yards below room 124. Conversely, several contaminants were detected above background at different locations below room 167 yet a smaller excavation of only 90 cubic yards is proposed. DTSC recommends that LLNL reevaluate the limits of the proposed soil excavations."*

Response-
LLNL agrees that the limits of the proposed soil excavation need further refinement. The initial soil excavation limits were intended to identify locations where elevated levels of one or more constituents were initially observed. The initial estimates were proposed using very conservative assumptions to determine the maximum volume of excavated soilthat may possibly be required. Follow up discussions with DTSC have provided further guidance, and LLNL has refined the proposed soil excavation limits and volumes based on DTSC's recommendations, which are included in Table 1 of Attachment B.

Comment 6-
"*Presentation Slide 32– The slide indicates that no radioactive components exceed the current residential screening guidance. For completeness, DTSC requests that LLNL indicate what standard or test is being applied to support this statement. DTSC recommends LLNL consider excavating soil from the area of boring location R124-001. We also recommend that LLNL consider expanding the excavation planned below room 167 to capture contaminations in near surface soils (<15 feet below ground surface) that may leach to groundwater."*

Response-

The residential RSL for radionuclides are discussed in response to comment no. 3. As indicated in Slide 32, the radionuclides with soil activities exceeding the residential RSLs are located within the volumes that LLNL proposes to remove. The slide should have indicated that there would not be any residual radionuclide contaminated soil with activities exceeding the residential RSLs once the soil removal is complete. LLNL has adjusted the proposed soil removal volumes to include soil containing tritium above 110 pCi/g below 1 ft depth. All of the soil with residual tritium activity above the screening level that is outside of the proposed soil removal volumes is less than a depth of 1 foot beneath the slab. The slab removal accounts for the removal of this soil immediately beneath the slab as part of the removal action.

A portion of the soil near location B-419-R124-001 has already been removed since this was an area where subsurface utilities were removed. LLNL has proposed additional soil removal in this area and has included a confirmatory sampling plan for the excavation.

LLNL does not plan to perform a DOE closure of the site in the near future. If a DOE closure is initiated in the future, it will likely involve the entire Livermore Site and would require a new characterization at that time. This characterization would include the Building 419 area.

Comment 7-

"*General Comment, Vapor Intrusion – Exposure to VOCs and also mercury can occur via the vapor intrusion pathway. Even though there is not a building present or planned, DTSC requests that LLNL evaluate whether the contamination presents a potential vapor intrusion risk. If clean closure is to be achieved, it should allow for unrestricted site use which includes construction of a building in the future."*

Response-

LLNL used the vapor intrusion evaluation guidance and tools provided by DTSC HHRA. The Johnson-Ettinger model was used with the maximum VOC and mercury concentrations measured in shallow soil, and the default exposure factors described in HHRA Note 1. The results indicate a cumulative cancer the risk from VOCs below 10^{-6} and the hazard quotient for both VOCs and mercury below 1. This risk will be further reduced once the soil removal is completed because some of the higher soil concentrations for VOCs and mercury are within the proposed soil removal.

Comment 8-

"*General Comment, Confirmation Sampling – Confirmation sampling should be performed following the excavation to verify that all contaminants above pre-agreed cleanup levels have been removed. LLNL should consider a combination of field techniques, such as X-Ray Fluorescence, as well as fixed laboratory analysis for confirmation sampling".*

Response-

LLNL has provided a detailed Confirmation Sampling Plan as **Attachment A** which describes the approach used in determining the sampling locations.

Comment 9-

"*General Comment, Closure Summary Document – DTSC requests that LLNL prepare a short summary document describing how the remaining closure activities will be implemented. The document should include certain closure details that were not specified in the closure plan e.g., excavation limits, waste disposal location, method of transportation, backfill source, surface finish, confirmation sampling plan etc. The document should include a schedule for implementing the remaining closure activities, including submittal of the closure certification report.*"

Response-

LLNL has provided a Closure Summary Document as **Attachment B** that describes the remaining closure activities for Building 419.

If you have any questions regarding this submittal please contact Bruce Schultz, Environmental Functional Area Manager, at (925) 423-3978.

Sincerely,

Bruce Schultz, Manager
Environmental Functional Area

copy:
DTSC:
Rizgar Ghazi, DTSC, Sacramento Office
Steven Pay, DTSC, Sacramento Office
Joseph Smith, Esq., DTSC Sacramento Office

LLNL:
Frances Alston, (ES&H Director)
Ariel Robertson, (DOE/LSO)
Phil Wong, (DOE/LSO)

ATTACHMENT A
Building 419 Post-excavation Confirmation Sampling Plan
Statistical methodology, number of samples, and sampling locations

Introduction

This section describes the number and placement of confirmation samples that will be collected after excavation and removal of contaminated soil from each of four removal locations within B419 site. The purpose of the sampling is to provide additional statistically based confidence that the soil removal was sufficient. The approach is based on methods in the Multi-Agency Radiation Source and Site Investigation Manual (MARSSIM; US EPA, 2000).

Statistical methodology

Statistical tests will consist of either the Wilcoxon Rank Sum (WRS) test or the Sign test, depending on factors described below. The tests will be implemented as described in MARSSIM. For the WRS test, the randomized LLNL site-wide background samples collected earlier in the B419 project will be used as the reference area.

The statistical tests will use the conservative assumption that an excavation site does not meet acceptability criterion:

H_o: The excavation site does not meet acceptability criterion

H_a: The excavation site meets acceptability criterion

Since 100% sampling is not possible, there is always and unavoidably some uncertainty about the decision. Two types of errors are possible: incorrectly rejecting H_o or incorrectly accepting H_o. These are generally referred to as Type I and Type II errors respectively. In everyday language, the Type I error consists of deciding an excavation site is not contaminated when in fact it is; the Type II error consists of deciding an excavation site is contaminated when in fact it not.

The power of a statistical test is the probability of correctly rejecting the null hypothesis. In this context, the power is the probability of demonstrating that an excavation site meets the acceptability criterion when in fact it does. The power of a statistical test is usually denoted by $1-\beta$, where β is the probability of a Type II error. The probability of a Type I error is usually denoted by α. Table A-1 illustrates these relationships.

Table A-1. Hypothesis test error definitions.

	Decision based on statistical test	
True condition of excavation site	**Does not meet criterion**	**Meets criterion**
Does not meet criterion (H_o is true)	Correct decision (Probability = $1-\alpha$)	*Incorrect* rejection of H_o (Probability = α)
Meets criterion (H_o is false)	*Incorrect* acceptance of H_o (Probability = β)	Correct decision (Power = $1-\beta$)

Number of confirmation samples

The methods described in this section are used to calculate the number of required samples separately for each analyte. The final number of confirmation samples will be the largest among them. Before calculating the number of samples, the site history and characterization data were reviewed and appropriate analytes and their respective screening limits (SLs) were selected.

In order to calculate the required number of samples, MARSSIM defines two values: the derived concentration guideline level (DCGL; also referred to as the upper bound of the gray region, or UBGR) and the lower bound of the gray region (LBGR). The interval between them is called "gray" because decision uncertainty is larger within the interval than outside it.

The LBGR, the DCGL, α, and power are inputs to the statistical design. These, together with an estimated standard deviation (s), determine the number of required samples. The width of the gray region (DCGL-LBGR) is referred to as delta (Δ). Delta divided by the standard deviation $\left(\Delta/s\right)$ is referred to as the relative shift. MARSSIM recommends that that the relative shift should be between 1 and 3.

The sign test is used when the analyte is not present in the background, or present in the background at only a small fraction of the DCGL. The sign test is also used when fewer than 40% of the background samples are detections, because the WRS test cannot be performed with a large proportion of non-detections. Otherwise, the WRS is be used.

For the following sample size calculations, the standard deviation is estimated from the reference data if possible, otherwise it is estimated from the B419 site-specific characterization samples. The LBGR is set at the median of the reference samples, if possible, otherwise at the median of the site-specific characterization samples. Summary statistics calculated from B419 site-specific characterization samples do not include any results above their respective SLs or non-detections with a reporting limit above the SL. The DCGL is set at the SL. The Type I error rate, α, is set at 0.1, and the power at 0.9, for both the WRS and sign tests.

Formulas and methods for calculating the number of samples are found in MARSSIM and NRC 1998, as well as the VSP and MARSSIM Methodology section below. Sample size calculations were performed using MARSSIM module of Visual Sample Plan (VSP) software (PNNL 2010).

Results for analytes using the WRS test are summarized in the Table A-2. All calculations use the reference data.

Table A-2. Required number of samples based on the WRS methodology.

Constituent	N of detections	N of samples	LBGR	DCGL	Std. Dev.	Units	Relative shift	WRS N
Arsenic	35	35	4.1	11	1.21	mg/kg	5.59	6
Chromium	35	35	29	48.9	10.6	mg/kg	1.8	9
Gross alpha	21	35	2.08	3.38	0.405	pCi/g	3.11	6
Gross beta	30	35	2.8	4.47	0.611	pCi/g	2.83	6

Results for analytes using the sign test are summarized in Table A-3. Analytes for which a sample size cannot be calculated are indicated with an NA in Table A-3. They will be tested using the sign test relative to their respective DCGLs.

- Hexavalent chromium had no detections in either the reference data or the B419 Site characterization samples, so the standard deviation cannot be estimated and a sample size cannot be calculated.

- The LBGR for mercury estimated from the reference data is only a small fraction of the DCGL.

- PCB 1248 was not analyzed for in the reference data and had only one detection in the B419 Site characterization samples, so the standard deviation cannot be estimated and a sample size cannot be calculated.

- PCB 1254 was not analyzed for in the reference data, so the LBGR and standard deviation are estimated from B419 Site characterization samples. The resulting LBGR is only a small fraction of the DCGL.

Table A-3. Required number of samples based on the sign test methodology.

Constituent	N of detections	N of samples	LBGR	DCGL	Std. Dev.	Units	Relative shift	Sign test N
Hexavalent Chromium	0	35	NA	2.2	NA	mg/kg	NA	NA
Mercury	23	35	0.044	10	0.0181	mg/kg	550	9
PCB 1248	1	212	NA	0.22	NA	mg/kg	NA	NA
PCB 1254	13	212	0.00498	0.22	0.017	mg/kg	12.3	9

As mentioned above, MARSSIM recommends that the relative shift should be between 1 and 3. It also suggests that when the relative shift is greater than three the LBGR should be adjusted upward to reduce the relative shift to a value no larger than three. The sample sizes shown in Tables A-2 and A-3 apply this adjustment, but the show the original LBGR and relative shift.

Chromium has the smallest relative shift and therefore the largest required number of samples, 9. The number of samples to be collected in each excavation site is nine.

VSP Results

The following table, excerpted from the VSP sampling design report for chromium, summarizes the sampling design.

SUMMARY OF SAMPLING DESIGN	
Primary Objective of Design	Compare a site mean or median to a reference area mean or median
Type of Sampling Design	Nonparametric
Sample Placement (Location) in the Field	Systematic with a random start location
Working (Null) Hypothesis	The difference between the medians (means) is less than or equal to the threshold
Formula for calculating number of sampling locations	Wilcoxon Rank Sum Test - MARSSIM version
Calculated total number of samples for each survey and reference area [a]	9
Number of samples on map [b]	9
Number of selected sample areas [c]	1
Specified sampling area [d]	(different for each excavation)
Size of grid / Area of grid [e]	(different for each excavation)
Grid pattern	Square

[a] Based on the analyte with the highest minimum number of survey unit samples.
[b] This number may differ from the calculated number because of 1) grid edge effects, 2) adding judgment samples, or 3) selecting or unselecting sample areas.
[c] The number of selected sample areas is the number of colored areas on the map of the site. These sample areas contain the locations where samples are collected.
[d] The sampling area is the total surface area of the selected colored sample areas on the map of the site.
[e] Size of grid / Area of grid gives the linear and square dimensions of the grid used to systematically place samples.

Interpretation of confirmation sampling results

The following steps will be used to evaluate the confirmation sampling results.

1. If the average of the results is greater than the SL, the excavation area does not meet the acceptance criterion. No statistical test is performed.

2. If all of the individual results are below the SL, the excavation area meets the acceptance criterion. No statistical test is performed.

3. If one or more individual results is above the SL and the average is below the SL, then the WRS test or sign test is performed.

As mentioned above, the WRS and sign tests will be conducted as described in MARSSIM (see MARSSIM Sections 8.3 and 8.4).

It should also be noted that the MARSSIM WRS methodology is designed to use the same number of samples in the reference area as in the "survey" area (the excavation site). For B419, there are 35 reference area samples, more than the required 9. This will give the WRS test additional power.

Sample Locations and Maps

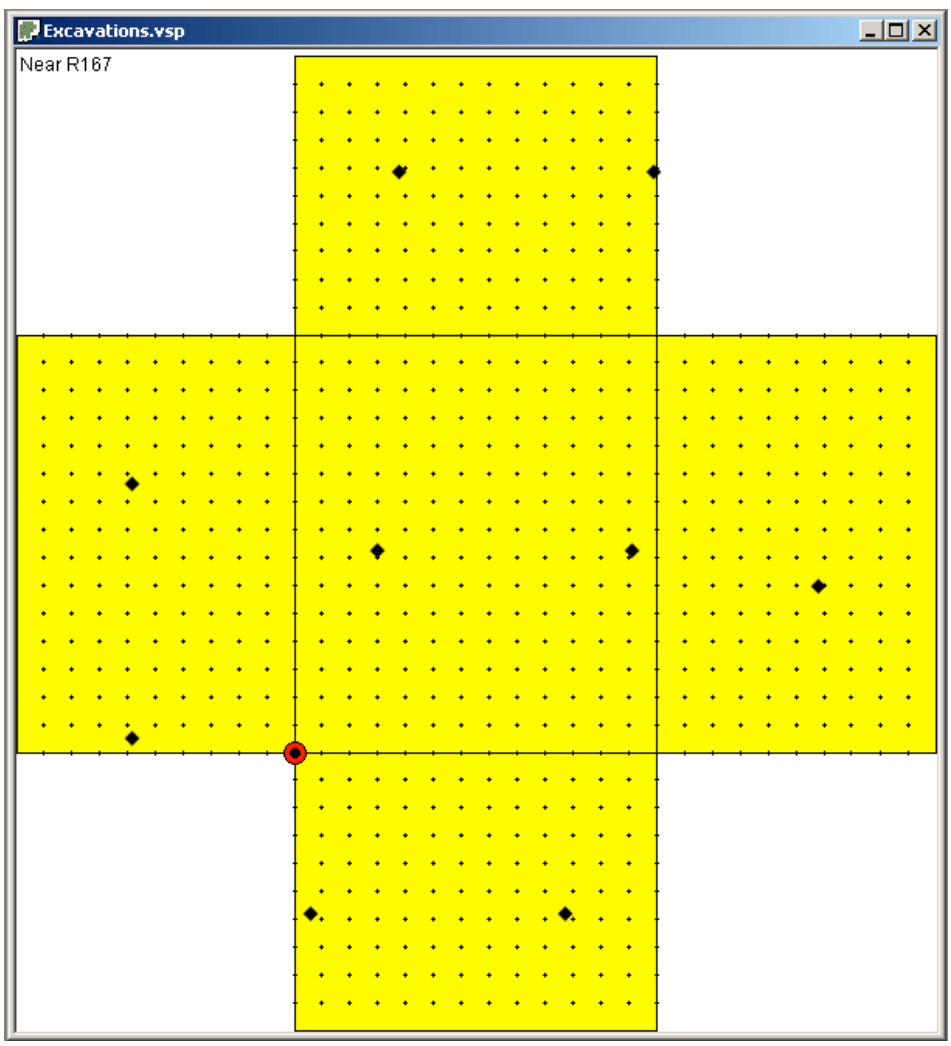
This section provides tables of sampling location coordinates and maps showing their locations, for each of the four excavation sites. The maps are "unfolded" views of each excavation pit. In the center of each map is the bottom (or "floor") of each pit. Walls are numbered clockwise from the top. The grid of small dots in each map indicates 1 foot spacing. The red dot in each map indicates the local origin (0,0) of the sampling location coordinates relative to the excavation pit. The true site coordinates of each local origin are given below. Coordinates are listed with precision as calculated by VSP, and may be rounded off as necessary for practical use in the field.

When placing a regularly spaced grid over a geometric shape it is not always possible to position the grid so that the number of grid points within the shape exactly matches the desired number of sampling locations. The VSP sampling design report refers to this as "grid edge effects."

Excavation site Near R167

Sampling coordinates in the table below are relative to the “lower left” corner of the excavation at (X,Y) = (10992,9058), indicated by the red dot in the figure. Z coordinates are relative to the “floor” (bottom) of the 10 ft deep excavation.

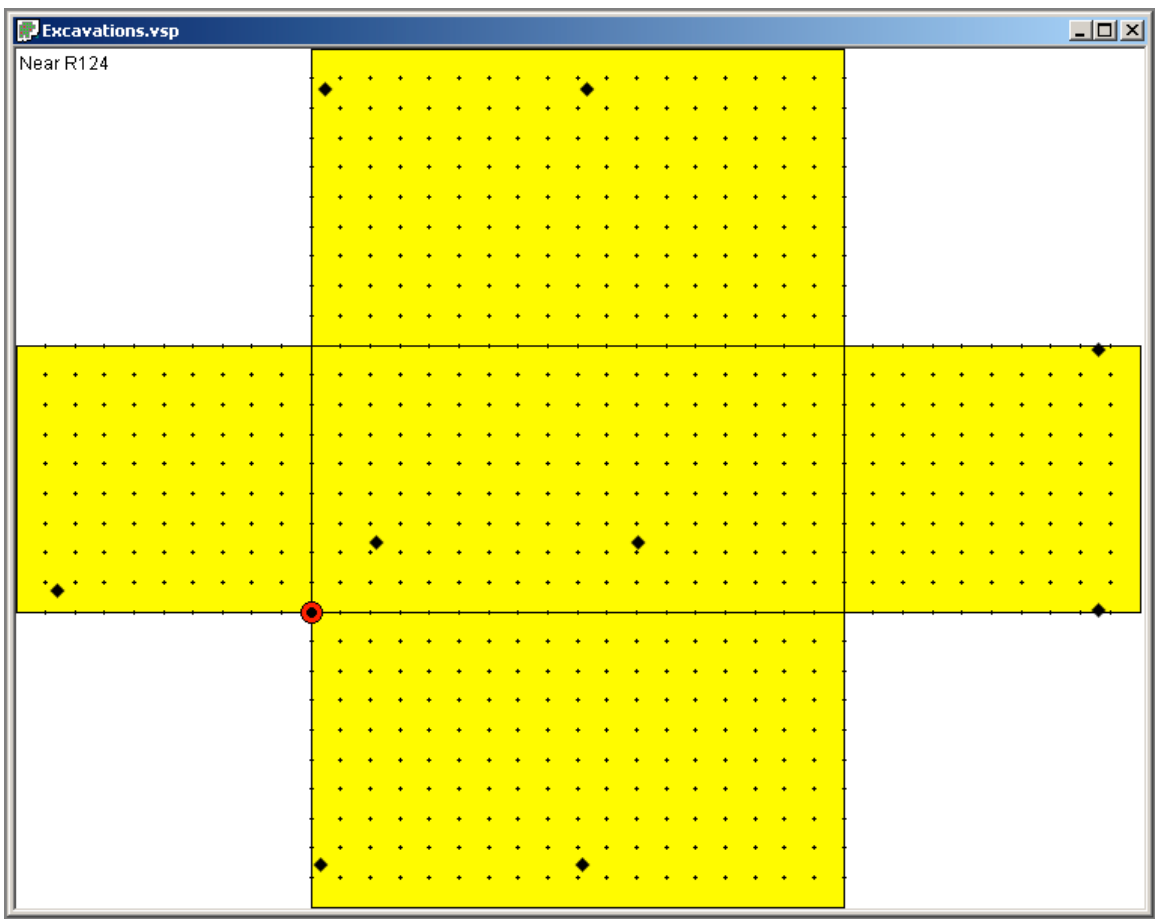
X Coord	Y Coord	Z Coord	Surface
2.9961	7.2283	0.0000	Floor
12.1551	7.2283	0.0000	Floor
0.5993	0.0000	5.8184	Wall 3
9.7583	0.0000	5.8184	Wall 3
13.0000	5.9174	5.8184	Wall 2
12.9235	15.0000	5.8184	Wall 1
3.7644	15.0000	5.8184	Wall 1
0.0000	9.6053	5.8184	Wall 4
0.0000	0.4462	5.8184	Wall 4



Excavation site Near R124

Sampling coordinates in the table below are relative to the “lower left” corner of the excavation at (X,Y) = (10983,8974), indicated by the red dot in the figure below. Z coordinates are relative to the “floor” (bottom) of the 10 ft deep excavation.

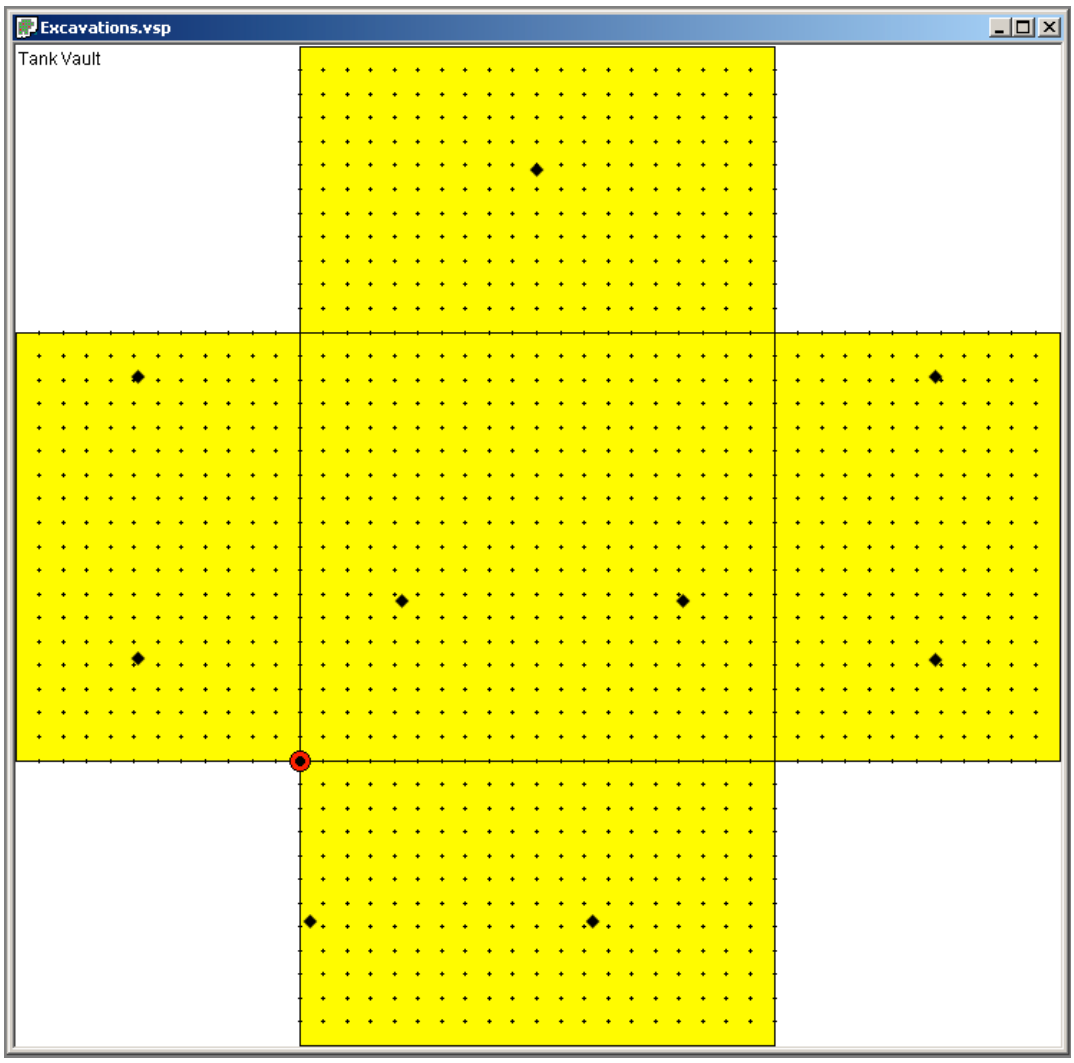
X Coord	Y Coord	Z Coord	Surface
2.2166	2.2890	0.0000	Floor
11.0484	2.2890	0.0000	Floor
0.3473	0.0000	8.5995	Wall 3
9.1791	0.0000	8.5995	Wall 3
18.0000	0.0109	8.5995	Wall 2
18.0000	8.8426	8.5995	Wall 2
9.3256	9.0000	8.5995	Wall 1
0.4939	9.0000	8.5995	Wall 1
0.0000	0.6621	8.5995	Wall 4



Excavation site Tank Vault

Sampling coordinates in the table below are relative to the “lower left” corner of the excavation at (X,Y) = (10947,8934), indicated by the red dot in the figure below. Z coordinates are relative to the “floor” (bottom) of the 12 ft deep excavation.

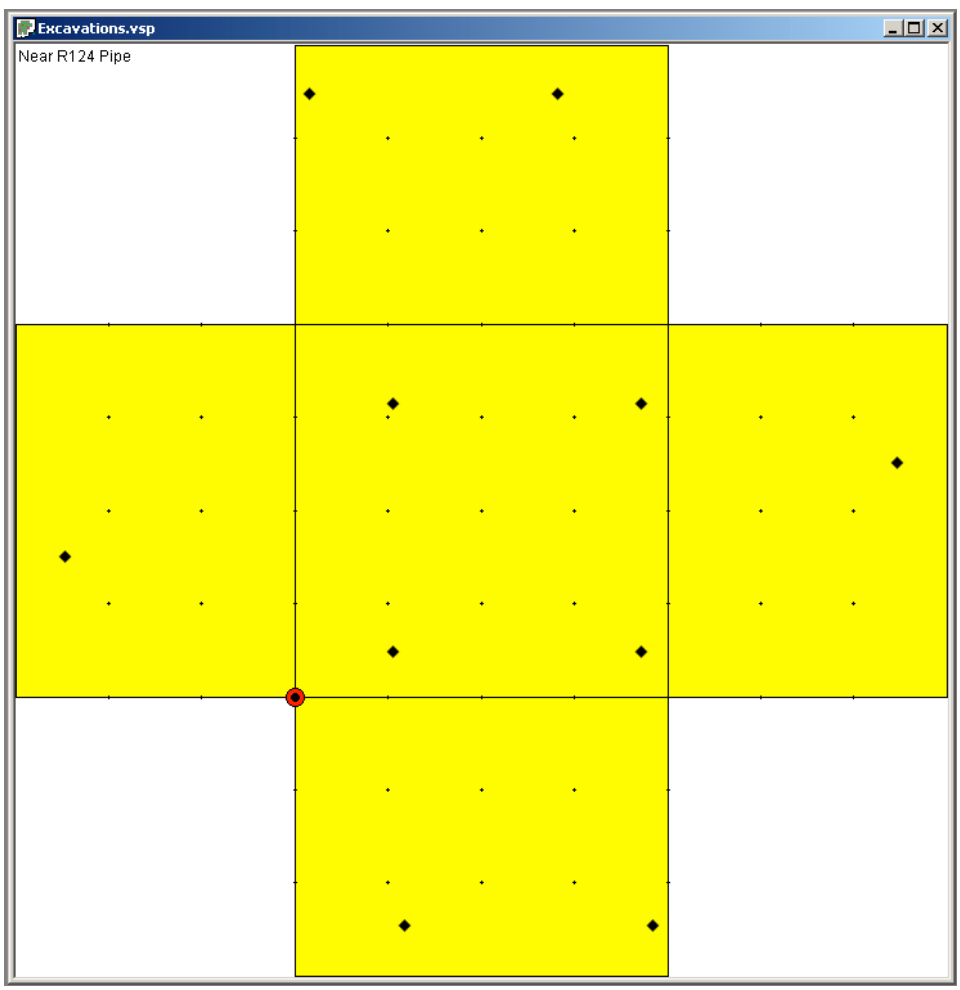
X Coord	Y Coord	Z Coord	Surface
4.2947	6.6936	0.0000	Floor
16.1831	6.6936	0.0000	Floor
0.4383	0.0000	6.8005	Wall 3
12.3266	0.0000	6.8005	Wall 3
20.0000	4.2150	6.8005	Wall 2
20.0000	16.1034	6.8005	Wall 2
10.0083	18.0000	6.8005	Wall 1
0.0000	16.1199	6.8005	Wall 4
0.0000	4.2315	6.8005	Wall 4



Excavation site Near R124 Pipe

Sampling coordinates in the table below are relative to the “lower left” corner of the excavation at (X,Y) = (10976,8953), indicated by the red dot in the figure below. Z coordinates are relative to the “floor” (bottom) of the 3 ft deep excavation. The VSP software generated 10 sampling locations due to grid edge effects.

X Coord	Y Coord	Z Coord	Surface
1.0569	0.4723	0.0000	Floor
3.7236	0.4723	0.0000	Floor
1.0569	3.1389	0.0000	Floor
3.7236	3.1389	0.0000	Floor
1.1754	0.0000	2.4615	Wall 3
3.8420	0.0000	2.4615	Wall 3
4.0000	2.5087	2.4615	Wall 2
2.8246	4.0000	2.4615	Wall 1
0.1580	4.0000	2.4615	Wall 1
0.0000	1.4913	2.4615	Wall 4



VSP and MARSSIM methodology

The following excerpt from the VSP report for Chromium describes the sample size calculation in detail.

Number of Total Samples: Calculation Equation and Inputs
The equation used to calculate the number of samples is based on Wilcoxon Rank Sum test published in MARSSIM (US EPA, et al, 1997). For this site, the null hypothesis is rejected in favor of the alternative one if the difference between the site and reference area median (mean) is sufficiently larger than the threshold. The number of samples to collect is calculated so that if the inputs to the equation are true, the calculated number of samples will cause the null hypothesis to be rejected.

The formula used to calculate the number of samples is:

$$n+m=\frac{\left(z_{1-\alpha}+z_{1-\beta}\right)^2}{3\left(P_r-0.5\right)^2}$$

where

$$P_r=\Phi\left(\frac{\Delta}{\sqrt{2s_{total}}}\right)$$

$\Phi(z)$ is the cumulative standard normal distribution on (-∞,z) (see PNNL-13450 for details),

P_r is the probability that a measurement collected from a random location at the study site is greater than a measurement collected from a random location in a reference area. See PNNL-13450 for details,

n is the number of samples for the site and is equal to m,

m is the number of samples for the reference area and is equal to n,

S_{total} is the estimated standard deviation of the measured values including analytical error,

Δ is the width of the gray region,

α is the acceptable probability of incorrectly concluding the difference between the medians(means) exceeds the threshold,

β is the acceptable probability of incorrectly concluding the difference between the medians(means) is less than the threshold,

$z_{1-\alpha}$ is the value of the standard normal distribution such that the proportion of the distribution less than $z_{1-\alpha}$, is $1-\alpha$,

$z_{1-\beta}$ is the value of the standard normal distribution such that the proportion of the distribution less than $z_{1-\beta}$, is $1-\beta$.

Note: MARSSIM suggests that the number of samples should be increased by at least 20% to account for missing or unusable data and uncertainty in the calculated value of n. VSP allows a user-supplied percent overage as discussed in MARSSIM (EPA 2000, p. 5-33).

The values of these inputs that result in the calculated number of sampling locations are:

Analyte	n	MARSSIM Overage	Parameter					
			S	Δ	α	β	$z_{1-\alpha}$ [a]	$z_{1-\beta}$ [b]
Analyte 1	9	20%	7.33	19.9	0.1	0.05	1.28155	1.64485

[a] This value is automatically calculated by VSP based upon the user defined value of α.
[b] This value is automatically calculated by VSP based upon the user defined value of β.

Sampling and analytical methods

The confirmation sampling will include all TTLC metals listed in method SW 6010, and gross alpha and beta using the method 9310, at all four soil excavation areas. The confirmatory samples from the excavation near the Tank Vault will also be analyzed for polychlorinated biphenyls (PCBs) using the method SW 8082. The confirmatory samples from the excavation near Room 167 will also be analyzed for PCBs using the method SW 8082 and Hexavalent Chromium using method 3060A-7196. In addition, one sample from the bottom of each of the four excavations will be analyzed for tritium using method 906EPSM to provide additional information for the CERCLA program in the future.

References

U.S. EPA, 2000, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575 Rev. 1, EPA 402-R-97-016 Rev. 1, DOE/EH-0624 Rev. 1.

Nuclear Regulatory Commission (NRC), 1998, A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys, NUREG-1505.

VSP Development Team (2012). *Visual Sample Plan: A Tool for Design and Analysis of Environmental Sampling* Version 6.2d. Pacific Northwest National Laboratory. Richland, WA. http://vsp.pnnl.gov.

ATTACHMENT B
Closure Summary Document

Overall Approach to Project Reactivation – The B419 project site has been in a safe standby condition awaiting additional funding and approvals to complete the RCRA closure activities since the initial demolition work was performed. Similar to work accomplished to date, LLNL plans on self-executing the remaining demolition and closure activities using a combination of LLNL resources and subcontracted support. Initial reactivation efforts have been focused obtaining necessary resources and approvals to accomplish work such as reviewing and updating safety plans, preparing procurement documents to obtain necessary equipment, materials and subcontracted support, and initiating waste management documentation for off-site disposal at the Nevada National Security Site (NNSS). Additional information is briefly described below regarding remaining discrete activities, including a projected schedule for completing the remaining closure activities (Figure 1).

LLNL will make every effort to complete the closure activities by the end of the calendar year, as DTSC has requested. However, if the work cannot be completed due to inclement weather, revised completion dates will be discussed with DTSC.

Remaining FY 2012/13 Discrete Activities

Documents Preparation and Retention

This activity includes project documentation and close out records.

Slab and Tank Enclosure Demolition and Contaminated Soil Excavation

The building slab and tank enclosure pit structure will be demolished and the associated contaminated soil below rooms 167 and 124, and the area adjacent to the tank vault will be excavated and removed. The estimated volumes of concrete and soil waste that will be generated by the remaining activities are shown in Table 1, and the excavation areas are shown in Figure 2.

The demolition will begin by processing concrete to rubble for loading/packaging by the large excavator. When the concrete has been completely removed, the soil will be excavated and packaged into waste bags on pallets. An additional excavator may be utilized to demolish the non-RCRA portions of the building simultaneously. When the slab and contaminated soil work is complete, work will move to the vault. Soil will be removed from around the vault walls and then the concrete structure will be demolished, processed and removed. Sampling will occur when the deeper excavation areas are exposed, the pits will be lined with a geotextile fabric and backfilling and compaction will commence following the installation of the fabric. LLNL has stockpiled clean soil from other on-site construction projects for use as backfill.

Based on the over 220 soil samples that were collected, analyzed, and risk-based modeled, soil excavation is being proposed from four distinct areas; under room 167, under room 124, the area near room 124 associated with location B-419-R124-001, and

the area surrounding the tank vault.

Based on a review of the analytical results it was determined that the soil under room 167 would need to be managed as a hazardous waste due to the presence of trichloroethylene. Since trichloroethylene was used as a solvent in the facility it was determined that the waste should be managed as a listed waste and a F002 code should be applied to all of the waste removed from below room 167. All of the analytical results were well below the LDR limit; therefore, this waste does not require treatment and can be directly disposed of as mixed waste meeting LDR.

Based on a review of the analytical results it was determined that the soil under room 124, and in the area near room 124 associated with location B-419-R124-001 will be managed as low-level radioactive waste.

A review of the analytical results of the soil beneath the tank vault indicated no hazardous constituents were present. However, LLNL determined that the soil would need to be managed as a listed waste. Trichloroethylene (TCE) was used for its solvent purposes when the facility was used for RCRA operations, and LLNL personnel who worked in the facility reported spills within the tank vault, where the piping was routed from Room 167. Therefore, the F002 hazardous waste listing will be applied to the soil removed from the vault area. Since no hazardous constituents were detected, the soil does not require treatment and can be directly disposed of as mixed waste meeting LDR.

Field Sampling and Analysis

The sampling plan will be updated to include the acquisition of soil samples from post excavation verification locations. An estimated 9 random samples from each of the excavation areas will be collected using a possible combination of methods, including excavator bucket, drill rig and/or hand auger. The resulting samples will be shipped to an offsite California-certified laboratory for analysis.

Waste Transportation and Disposal

The final phase of the B419 Demolition is expected to generate up to 55 shipments of low-level radioactive waste, 33 shipments of mixed waste meeting LDR to NNSS. LLNL's Radioactive and Hazardous Waste Management Program personnel will oversee the packaging and shipping of waste to ensure the NNSS disposal site waste acceptance criteria and requirements are met.

Site Restoration and Demobilization

The B419 site will be returned to grade, and the project will consist of repairing and replacing damaged paving and demobilizing the project equipment. An asphalt layer will be applied to the project area, and the grading and paving will be performed to assure proper drainage. When all waste has been removed from the project site and the waste accumulation area is closed, the project site will be closed. Assuming regulatory concurrence that all closure activities have been satisfactorily completed, the paved area will be released to the institution.

Professional Engineering Oversight/ Certificate of Closure

The Professional Engineer will continue overseeing the RCRA closure activities to ensure that activities are being performed in accordance with the DTSC-approved Closure Plan as amended. The certified Professional Engineer who has been maintaining documentation of his closure inspections and reviews of all analytical and other data generated during closure will prepare the final closure certification. This will be submitted within 60 days after the completion of closure activities.

Figure 1. Estimated project schedule

Activity Name	Duration (Days)	Start Date	Finish Date	2012					2013				
				Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
B419 RCRA Closure Project Restart Schedule	**223.00**	**8/1/12**	**6/7/13**										
Project Management/Regulatory Interface	223.00	8/1/12	6/7/13										
Project Closing Documents Preparation and Retention	104.00	1/15/13	6/7/13										
Slab and Tank Enclosure Demolition and Contaminated Soil Excavation	64.00	9/4/12	11/30/12										
Field Sampling and Analysis	64.00	9/4/12	11/30/12										
Waste Transportation and Disposal	106.00	10/1/12	2/25/13										
Site Restoration and Demobilization	43.00	11/1/12	12/31/12										
Professional Engineering Oversight/Certificate of Closure	223.00	8/1/12	6/7/13										
				Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May

Figure 2. Proposed soil removal volumes beneath Building 419.

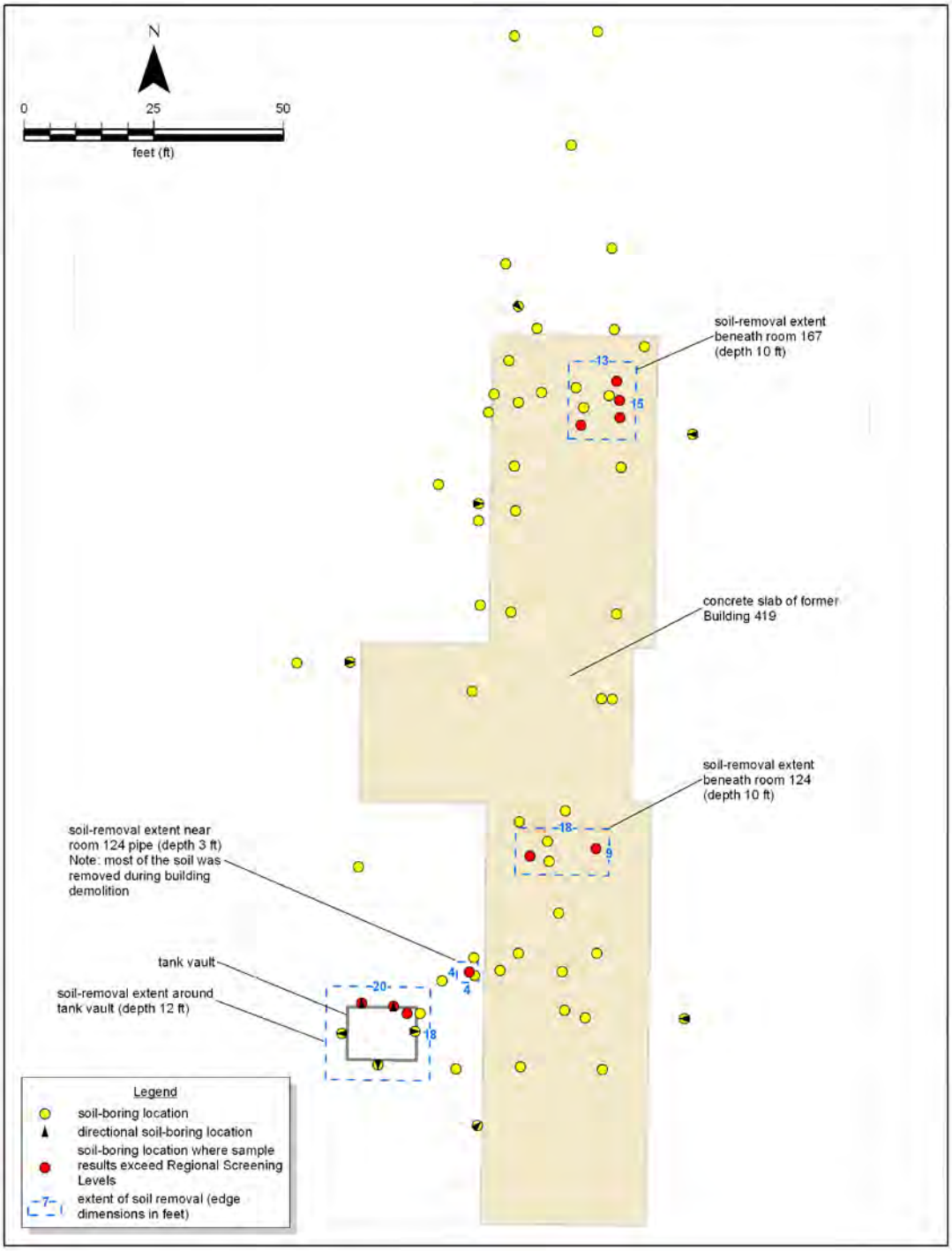


Table 1. Projected waste volumes for remaining activities.

Media	Volume to be Shipped [1]	Characterization
Facility Concrete Pad	473 yds^3	Low-level waste
Soil Beneath R-167	144 yds^3	Mixed waste
Soil Beneath R-124	120 yds^3 [(2)]	Low-level waste
Concrete Tank Vault	20 yds^3	Mixed waste
Soil Beneath Tank Vault	226 yds^3	Mixed waste

[1] The volumes take into account fluffing that occurs during digging operations, packaging efficiencies, and any potential slight increases in volume during digging operations.
[2] Includes volume of soil removed from the area near room 124 associated with location B-419-R124-001.

Matthew Rodriquez
Secretary for
Environmental Protection

Department of Toxic Substances Control

Deborah O. Raphael, Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Edmund G. Brown Jr.
Governor

September 24, 2012

Mr. Bruce Schultz, Manager
Environmental Function Area
Lawrence Livermore National Laboratory
7000 East Avenue, L-627
Livermore, California 94550

CLOSURE OF BUILDING 419 AT THE LAWRENCE LIVERMORE NATIONAL LABORATORY, LIVERMORE, CALIFORNIA; EPA ID NO.: CA2890012584

Dear Mr. Schultz:

On May 22, 2012, the Department of Toxic Substances control (DTSC) met with representatives from the Lawrence Livermore National Laboratory (LLNL) to discuss the closure of Building 419. Following the meeting, DTSC provided comments on LLNL's presentation under cover letter dated June 12, 2012. On August 16, 2012, DTSC received a response to comments document prepared by LLNL staff from the Environmental Function Area, Environmental Support and Programmatic Outreach.

The response to comments document was reviewed by DTSC staff and was discussed with LLNL during telephone conferences held on August 22, 2012, and September 13, 2012. LLNL submitted page replacements for the response to comments document on September 19, 2012. DTSC approves the response to comments document subject to the enclosed comments and conditions. DTSC directs LLNL to proceed with implementation of the Closure Plan.

In order to account for the full volume of soil to be excavated, DTSC has prepared a California Environmental Quality Act (CEQA) Notice of Exemption. The Notice of Exemption finds that with the control measures proposed, the increase in the volume of soil to be excavated from 50 cubic yards to approximately 500 cubic yards will not result in a significant impact to human health or the environment. A copy of the CEQA NOE is enclosed.

The response to comments document included a revised project schedule; DTSC looks forward to receipt of the closure certification report for Building 419 by the end of May 2013.

Printed on Recycled Paper

If you have any questions regarding this letter, please contact me at (916) 255-6665 or at Rizgar.Ghazi@dtsc.ca.gov.

Sincerely,

Rizgar Ghazi, P.E.
Unit Chief
Engineering and Special Projects Office

Enclosures (2)

cc: Ms. Vicki Salvo
Lawrence Livermore National Laboratory
7000 East Avenue, L-627
Livermore, California 94550

Mr. Mohammed Abri, P.E.
C/O Lawrence Livermore National Laboratory
7000 East Avenue, L-627
Livermore, California 94550

cc (via email):

Mr. Ryan Batty, P.E., DTSC-ESPO, Ryan.Batty@dtsc.ca.gov
Mr. Stephen Pay, P.G., DTSC, Stephen.Pay@dtsc.ca.gov
Valerie Mitchell, Ph.D., DTSC-HERO, Valerie.Mitchell@dtsc.ca.gov
Mr. Jacinto Soto, DTSC, Jacinto.Soto@dtsc.ca.gov

Enclosure to DTSC Letter dated September 24, 2012

LLNL Response to Comments document dated August 16, 2012 (as revised)

Comments

1. The document contains screening levels and a confirmation sampling plan for radionuclides. The elements of the document relating to radionuclides are not subject to approval by DTSC. LLNL is responsible for ensuring that activities concerning radionuclides meet the requirements of the U.S. Department of Energy as well as other regulatory agencies.

2. The document indicates that groundwater below Building 419 is contaminated with volatile organic compounds that are mostly originating from up-gradient sources. LLNL has not provided adequate evidence to DTSC to establish the source(s) of the groundwater contamination below Building 419. The document indicates that LLNL is addressing the groundwater contamination below Building 419 under the site wide Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) program.

3. The document indicates that the potential for vapor intrusion was evaluated using soil matrix data and the Johnson and Ettinger model. DTSC recommends evaluating the vapor intrusion pathway with soil gas data rather than soil matrix data and the model output was not provided to DTSC for review. DTSC recommends that the CERCLA program collect near surface soil gas samples from the Building 419 site prior to ending soil vapor extraction.

Conditions

4. If confirmation soil sampling indicates that hazardous waste or constituents remain at concentrations exceeding screening levels, as determined by the appropriate statistical test, then LLNL is required perform a human health risk assessment. The human health risk assessment shall consider cumulative impacts and the findings of the risk assessment shall be presented in the closure certification report.

5. LLNL shall ensure that adequate measures are in place to control run-on or run-off from the Building 419 site during storm events. Any rainwater that accumulates during the course of closure activities shall be contained pending analysis and disposal. The project site shall remain protected with a tarpaulin or other suitable cover until the asphalt cap can be installed.

6. The asphalt cap will limit infiltration of rainwater which will in turn reduce the mobility of contaminants in deeper soils. The cap must be sloped to function with existing storm drains and must be engineered to withstand vehicle loads. DTSC requests that LLNL provide design documents, including drawings, explaining the engineering basis for the asphalt cap. The drawings shall include elevations to show how surface drainage will be achieved and shall include specifications for the sub-base and asphalt surface. The drawings shall be submitted to DTSC for review and approval prior to construction start.

Appendix M

List of Clean Closure Standards

(also referred to as Screening Levels)

Compound description	Units	Maximum Value Detected at Building 419	LLNL Background Value	EPA Residential Screening Level	Other Screening Levels	Clean Closure Standards Used for Building 419 RCRA Closure	Description
Antimony	mg/kg	2.9	2.2	31		31	
Arsenic	mg/kg	37	7.59	0.39	11	11	Regional background based on SFRWQCB study is 11 mg/kg
Barium	mg/kg	1000	332	15000		15000	
Beryllium	mg/kg	40	0.55	160		160	
Cadmium	mg/kg	4	0.55	70		70	
Chromium	mg/kg	300	48.9			48.9	Background value selected for screening
Cobalt	mg/kg	170	16.7	23	660	660	CHHSL screening level selected per DTSC
Copper	mg/kg	200	35.8	3100		3100	
Hexavalent Chromium	mg/kg	12	2.2	0.29		2.2	Background value selected for screening
Lead	mg/kg	330	14.3	400	80	400	DTSC HHRA Note #3, 95% UCL should be below 80 mg/kg
Mercury	mg/kg	66	0.0759	10		10	
Molybdenum	mg/kg	7	1.1	390		390	
Nickel	mg/kg	430	70.1	1500		1500	
Selenium	mg/kg	0.74	0.55	390		390	
Silver	mg/kg	9	1.1	390		390	
Thallium	mg/kg	1.2	1.1	0.78	5	5	CHHSL screening level selected per DTSC
Vanadium	mg/kg	180	43.7	390		390	
Zinc	mg/kg	280	69.8	23000		23000	
1,1-Dichloroethene	mg/kg	0.018		240		240	
1,2-Dichloroethane	mg/kg	0.067		0.43		0.43	
Acetone	mg/kg	0.43		61000		61000	
Benzene	mg/kg	0.024		1.1		1.1	
Carbon tetrachloride	mg/kg	0.009		0.61		0.61	
Methylene chloride	mg/kg	0.015		11		11	
Tetrachloroethene	mg/kg	0.0095		0.55		0.55	
Toluene	mg/kg	0.023		5000		5000	
Trichloroethene	mg/kg	0.43		0.91		0.91	
Benzo(a)anthracene	mg/kg	0.37		0.15		4	0.4 mg/kg background in benzo(a)pyrene eqivalency
Benzo(b)fluoranthene	mg/kg	0.42		0.15		4	0.4 mg/kg background in benzo(a)pyrene eqivalency
Bis(2-ethylhexyl)phthalate	mg/kg	5.9		35		35	
Chrysene	mg/kg	0.41		15		15	
Diesel Fuel	mg/kg	610				N/A	Compound not within Bldg. 419 footprint, no action required per DTSC
Fluoranthene	mg/kg	0.84		2300		2300	
Gasoline fingerprint	mg/kg	1.2				N/A	Compound not within Bldg. 419 footprint, no action required per DTSC
m- and p-Xylene Isomers	mg/kg	0.0089		630		630	
Naphthalene	mg/kg	0.007		3.6		3.6	
PCB 1248	mg/kg	0.35		0.22		0.22	
PCB 1254	mg/kg	6.9		0.22		0.22	
Phenanthrene	mg/kg	0.77				4	0.4 mg/kg background in benzo(a)pyrene eqivalency
Pyrene	mg/kg	0.74		1700		1700	
Actinium 228	pCi/g	0.97	1.5	679		679	
Americium 241	pCi/g	150	0.062	1.8		1.8	
Bismuth 214	pCi/g	0.52	0.912	7950		7950	
Cesium 137	pCi/g	1.08	0.16	4.02		4.02	
Cobalt 56	pCi/g	1.12	0.428	0.651		0.651	
Curium 242	pCi/g	0.24	0.0143	320		320	
Gross alpha	pCi/g	262	3.38			3.38	Background value selected for screening
Gross beta	pCi/g	28.1	4.47			4.47	Background value selected for screening
Lead 212	pCi/g	0.88	0.938	3550		3550	
Lead 214	pCi/g	0.58	0.844	44800		44800	
Plutonium 238	pCi/g	1.07	0.0355	2.95		2.95	
Plutonium 239+240	pCi/g	32.2	0.046	2.58		2.58	
Potassium 40	pCi/g	13.4	18.4	0.116		18.4	Background value selected for screening
Strontium 90	pCi/g	1.15	0.264	0.344		0.344	
Thallium 208	pCi/g	0.33	0.371	23100		23100	
Thorium 228	pCi/g	0.83	0.991	23.4		23.4	
Thorium 230	pCi/g	0.6	0.957	3.46		3.46	
Thorium 232	pCi/g	0.78	0.983	3.07		3.07	
Thorium 234	pCi/g	30	2.44	1270		1270	
Tritium	pCi/g	1920	0.106	0.882	110	110	DOE Order 458.1 and FR V64 68396
Uranium 234 and Uranium 233	pCi/g	18.4	0.76	3.86		3.86	
Uranium 235 and Uranium 236	pCi/g	1.39	0.0904	0.192		0.192	
Uranium 238	pCi/g	46	0.717	4.48		4.48	

Compounds Not Detected at Building 419

Compound description	Units	Maximum Value Detected at Building 419	LLNL Background Value	EPA Residential Screening Level	Other Screening Levels	Screening Level Used for Building 419 RCRA Closure	Comment
1,1-Dichloroethane	mg/kg	<0.0033		3.3		3.3	
1,1-Dichloropropene	mg/kg	<0.0033				N/A	Compound not detected
1,1,1-Trichloroethane	mg/kg	<0.0033		8700		8700	
1,1,1,2-Tetrachloroethane	mg/kg	<0.0033		1.9		1.9	
1,1,2-Trichloroethane	mg/kg	<0.0033		1.1		1.1	
1,1,2,2-Tetrachloroethane	mg/kg	<0.0033		0.56		0.56	
1,2-Dibromo-3-chloropropane	mg/kg	<0.0066		0.0054		0.0054	
1,2-Dichlorobenzene	mg/kg	<0.0033		1900		1900	
1,2-Dichloropropane	mg/kg	<0.0033		0.94		0.94	
1,2,3-Trichlorobenzene	mg/kg	<0.0033		49		49	
1,2,3-Trichloropropane	mg/kg	<0.0033		0.005		0.005	
1,2,4-Trichlorobenzene	mg/kg	<0.0033		22		22	
1,2,4-Trimethylbenzene	mg/kg	<0.0033		62		62	
1,3-Dichlorobenzene	mg/kg	<0.0033				N/A	Compound not detected
1,3-Dichloropropane	mg/kg	<0.0033		1600		1600	
1,3,5-Trimethylbenzene	mg/kg	<0.0033		780		780	
1,4-Dichlorobenzene	mg/kg	<0.0033		2.4		2.4	
2-Butanone	mg/kg	<0.013		28000		28000	
2-Chloroethylvinylether	mg/kg	<0.0033				N/A	Compound not detected
2-Chloronaphthalene	mg/kg	<0.31		6300		6300	
2-Chlorophenol	mg/kg	<0.31		390		390	
2-Chlorotoluene	mg/kg	<0.0033		1600		1600	
2-Hexanone	mg/kg	<0.013		210		210	
2-Methyl-4,6-dinitrophenol	mg/kg	<0.62		4.9		4.9	
2-Methylnaphthalene	mg/kg	<0.31		310		310	
2-Nitroaniline	mg/kg	<0.62		610		610	
2-Nitrophenol	mg/kg	<0.31				N/A	Compound not detected
2,2-Dichloropropane	mg/kg	<0.0033				N/A	Compound not detected
2,4-Dichlorophenol	mg/kg	<0.31		180		180	
2,4-Dimethylphenol	mg/kg	<0.31		1200		1200	
2,4-Dinitrophenol	mg/kg	<0.62		120		120	
2,4-Dinitrotoluene	mg/kg	<0.31		1.6		1.6	
2,4,5-Trichlorophenol	mg/kg	<0.31		6100		6100	
2,4,6-Trichlorophenol	mg/kg	<0.31		44		44	
2,6-Dinitrotoluene	mg/kg	<0.31		61		61	
3-Nitroaniline	mg/kg	<0.62				N/A	Compound not detected
3,3-Dichlorobenzidine	mg/kg	<0.31		1.1		1.1	
4-Bromophenylphenylether	mg/kg	<0.31				N/A	Compound not detected
4-Chloro-3-methylphenol	mg/kg	<0.31		6100		6100	
4-Chloroaniline	mg/kg	<0.31		2.4		2.4	
4-Chlorophenylphenylether	mg/kg	<0.31				N/A	Compound not detected
4-Chlorotoluene	mg/kg	<0.0033		1600		1600	
4-Methyl-2-pentanone	mg/kg	<0.013		5300		5300	
4-Nitroaniline	mg/kg	<0.62		24		24	
4-Nitrophenol	mg/kg	<0.62				N/A	Compound not detected
Acenaphthene	mg/kg	<0.31		3400		3400	
Acenaphthylene	mg/kg	<0.31				N/A	Compound not detected
Aniline	mg/kg	<0.31		85		85	
Anthracene	mg/kg	<0.31		17000		17000	
Benzidine	mg/kg	<1.5		0.0005		0.0005	
Benzo(a)pyrene	mg/kg	<0.31		0.015		0.4	0.4 mg/kg background in benzo(a)pyrene eqivalency
Benzo(g,h,i)perylene	mg/kg	<0.31				4	0.4 mg/kg background in benzo(a)pyrene eqivalency
Benzo(k)fluoranthene	mg/kg	<0.31		1.5		1.5	
Benzoic Acid	mg/kg	<1.5		240000		240000	
Benzyl Alcohol	mg/kg	<0.31		6100		6100	
Bis(2-chloroethoxy)methane	mg/kg	<0.31		180		180	
Bis(2-chloroethyl)ether	mg/kg	<0.31		0.21		0.21	
Bis(2-chloroisopropyl)ether	mg/kg	<0.31		4.6		4.6	
Bromobenzene	mg/kg	<0.0033		300		300	
Bromodichloromethane	mg/kg	<0.0033		0.27		0.27	
Bromoform	mg/kg	<0.0033		62		62	
Bromomethane	mg/kg	<0.0033		7.3		7.3	
Butylbenzylphthalate	mg/kg	<0.31		260		260	
Carbon disulfide	mg/kg	<0.0033		820		820	
Chlorobenzene	mg/kg	<0.0033		290		290	
Chloroethane	mg/kg	<0.0033		15000		15000	
Chloroform	mg/kg	<0.0033		0.29		0.29	
Chloromethane	mg/kg	<0.0033		120		120	
cis-1,2-Dichloroethene	mg/kg	<0.0033		160		160	
cis-1,3-Dichloropropene	mg/kg	<0.0033				N/A	Compound not detected
Cyanide	mg/kg	<0.51		1600		1600	
Di-n-octylphthalate	mg/kg	<0.31				N/A	Compound not detected
Dibenzo(a,h)anthracene	mg/kg	<0.31		0.015		0.015	
Dibenzofuran	mg/kg	<0.31		78		78	

Compounds Not Detected at Building 419

Compound description	Units	Maximum Value Detected at Building 419	LLNL Background Value	EPA Residential Screening Level	Other Screening Levels	Screening Level Used for Building 419 RCRA Closure	Comment
Dibromochloromethane	mg/kg	<0.0033		0.68		0.68	
Dibromomethane	mg/kg	<0.0033		25		25	
Dibutylphthalate	mg/kg	<0.31		6100		6100	
Dichlorodifluoromethane	mg/kg	<0.0033		94		94	
Diethylphthalate	mg/kg	<0.31		49000		49000	
Dimethylphthalate	mg/kg	<0.31				N/A	Compound not detected
Ethylbenzene	mg/kg	<0.0033		5.4		5.4	
Ethylene Dibromide	mg/kg	<0.0033		0.034		0.034	
Fluorene	mg/kg	<0.31		2300		2300	
Freon 113	mg/kg	<0.0033		43000		43000	
Hexachlorobenzene	mg/kg	<0.31		0.3		0.3	
Hexachlorobutadiene	mg/kg	<0.0033		6.2		6.2	
Hexachlorocyclopentadiene	mg/kg	<0.31		370		370	
Hexachloroethane	mg/kg	<0.31		12		12	
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.31		0.15		0.15	
Isophorone	mg/kg	<0.31		510		510	
Isopropylbenzene	mg/kg	<0.0033		2100		2100	
m-Cresol	mg/kg	<0.31		3100		3100	
n-Butylbenzene	mg/kg	<0.0033		3900		3900	
N-Nitrosodi-n-propylamine	mg/kg	<0.31		0.069		0.069	
N-Nitrosodimethylamine	mg/kg	<0.31		0.0023		0.0023	
N-Nitrosodiphenylamine	mg/kg	<0.31		99		99	
n-Propylbenzene	mg/kg	<0.0033		3400		3400	
Nitrobenzene	mg/kg	<0.31		4.8		4.8	
o-Cresol	mg/kg	<0.31		3100		3100	
o-Xylene	mg/kg	<0.0033		690		690	
p-Isopropyl toluene	mg/kg	<0.0033				N/A	Compound not detected
Pentachlorophenol	mg/kg	<0.62		0.89		0.89	
Phenol	mg/kg	<0.31		18000		18000	
sec-Butylbenzene	mg/kg	<0.0033				N/A	Compound not detected
Styrene	mg/kg	<0.0033		6300		6300	
tert-Butylbenzene	mg/kg	<0.0033				N/A	Compound not detected
trans-1,2-Dichloroethene	mg/kg	<0.0033		150		150	
trans-1,3-Dichloropropene	mg/kg	<0.0033				N/A	Compound not detected
Trichlorofluoromethane	mg/kg	<0.0033		790		790	
Vinyl acetate	mg/kg	<0.013		970		970	
Vinyl chloride	mg/kg	<0.0033		0.06		0.06	
PCB 1016	mg/kg	<0.031		3.9		3.9	
PCB 1221	mg/kg	<0.062		0.14		0.14	
PCB 1232	mg/kg	<0.031		0.14		0.14	
PCB 1242	mg/kg	<0.031		0.22		0.22	
PCB 1260	mg/kg	<0.031		0.22		0.22	
PCB 1262	mg/kg	<0.031				N/A	Compound not detected
PCB 1268	mg/kg	<0.031				N/A	Compound not detected
Aluminum 26	pCi/g	<0.21	0.133	0.00892		0.133	Compound not detected, background value selected for screening
Antimony 124	pCi/g	<0.37	0.145	1.63		1.63	
Antimony 125	pCi/g	<0.4	0.35	0.472		0.472	
Beryllium 7	pCi/g	<2.8	1.15	75.6		75.6	
Bismuth 212	pCi/g	<1.9	2.52	20500		20500	
Carbon 14	pCi/g	<20	10.2	0.476		10.2	Compound not detected, background value selected for screening
Cerium 139	pCi/g	<0.16	0.0777	12.8		12.8	
Cerium 144	pCi/g	<0.97	0.626	43.3		43.3	
Cesium 134	pCi/g	<0.17	0.189	0.163		0.189	Compound not detected, background value selected for screening
Chromium 51	pCi/g	<4.6	0.957	239		239	
Cobalt 57	pCi/g	<0.11	0.0547	8.09		8.09	
Cobalt 58	pCi/g	<0.32	0.181	8.09		8.09	
Cobalt 60	pCi/g	<0.149	0.154	0.0389		0.154	Compound not detected, background value selected for screening
Curium 244	pCi/g	<0.1	0.0269	6.65		6.65	
Europium 152	pCi/g	<0.97	0.88	0.0406		0.88	Compound not detected, background value selected for screening
Europium 154	pCi/g	<1.2	0.852	0.0479		0.852	Compound not detected, background value selected for screening
Europium 155	pCi/g	<0.39	0.34	3.63		3.63	
Iodine 131	pCi/g	<4.5	0.395	63.8		63.8	
Iron 59	pCi/g	<0.74	0.399	3.49		3.49	
Manganese 54	pCi/g	<0.18	0.159	0.726		0.726	
Niobium 94	pCi/g	<0.21	0.137	0.016		0.137	Compound not detected, background value selected for screening
Niobium 95	pCi/g	<0.36	0.169			N/A	Compound not detected
Protactinium 234m	pCi/g	<28	29.6	13600000		13600000	
Ruthenium 106	pCi/g	<2.2	1.25	41.2		41.2	
Scandium 46	pCi/g	<0.39	0.134	1.11		1.11	
Silver 110m	pCi/g	<0.19	0.161	0.254		0.254	
Sodium 22	pCi/g	<0.22	0.188	0.0902		0.188	Compound not detected, background value selected for screening
Technetium 99	pCi/g	<3	0.647	0.261		0.647	Compound not detected, background value selected for screening
Thorium 227	pCi/g	<0.64	1.05	105		105	
Uranium 235	pCi/g	<0.57	0.645	0.192		0.645	Compound not detected, background value selected for screening
Zinc 65	pCi/g	<0.54	0.261	1.25		1.25	

Appendix N

Geotextile Material Data Sheet

PRODUCT DATA SHEET

GSE CE Nonwoven Needlepunched Geotextiles

GSE CE Geotextiles are a family of staple fiber nonwoven needle-punched geotextiles developed and manufactured with the specific intent to meet AASHOT M288 requirements. The geotextiles are manufactured using an advanced manufacturing and quality system to produce the most uniform and consistent nonwoven needle-punched geotextile currently available in the industry. GSE combines a fiber selection and approval system with an in-line quality control and a state-of-the-art laboratory to ensure that every roll shipped meets customer specifications and for various applications.

AT THE CORE:
Civil nonwoven geotextiles are used in the transportation industry for construction of roadways.

Product Specifications

Tested Property[2]	Test Method	Minimum Average Roll Value[1]			
		CE3	CE4	CE6	CE8
Grab Tensile Strength, lb	ASTM D 4632	90	120	160	205
Grab Elongation, %	ASTM D 4632	50	50	50	50
Puncture Strength, lb	ASTM D 4833	55	65	90	120
Mullen Burst Strength, psi	ASTM D 3786	175	230	280	350
Trapezoidal Tear, lb	ASTM D 4533	40	50	65	85
UV Resistance, % retained after 500 hours	ASTM D 4355	70	70	70	70
Apparent Opening Size, Sieve No., (mm)	ASTM D 4751	70 (0.212)	70 (0.212)	70 (0.212)	80 (0.180)
Permittivity, sec^{-1}	ASTM D 4491	2.0	2.0	1.5	1.3
Flow rate, $gal/min/ft^2$	ASTM D 4491	150.0	140.0	110.0	95.0
AASHTO M288 Class		<3	3	2	1
TYPICAL ROLL DIMENSIONS					
Roll Width x Length[3]		CE3 (15' x 360') 600 sy CE3N[4] (12.5' x 360') 500 sy	CE4 (15' x 360') 600 sy CE4N[4] (12.5' x 360') 500 sy	CE6 (15' x 300') 500 sy CE6N[4] (12.5' x 360') 500 sy	CE8 (15' x 300') 500 sy CE8N[4] (12.5' x 360') 500 sy

NOTES:
- [1]All values are minimum average roll values except apparent opening size in mm which is a maximum average roll value.
- [2]All values in weaker principal direction.
- [3]Roll lengths and widths have a tolerance of ±1%.
- [4]N denotes Narrow.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

GSE ENVIRONMENTAL™

DURABILITY RUNS DEEP

For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.

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Appendix O

Backfill Soil Information

Interdepartmental letterhead

Mail Station L- 509

Ext. 3-8336

Environment, Safety & Health
ES&H Team 2

February 6, 2012
ESH-T2-12-023

MEMORANDUM

To: Mike Petrangelo

From: Lisa Crawford, Environmental Analyst, ES&H Team 2 KD for LC

Subject: *Management of Soil from the Building 490 Landscaping Project*
Location: Northwest side of Building 490
Sample Number: PC-B490-005-01-01-SC-3U

The ten cubic yards of soil excavated from this project area meets all environmental reuse requirements; however, there is currently no use for this soil onsite. Therefore, the soil has been evaluated for disposal at the Altamont Landfill.

Analytical data from the Building 490 (B-490) Landscaping Project obtained on May 13, 2011, were used to characterize soil from the B-490 Landscaping Project on the northwest side of the building. These data are submitted as representative data for the B-490 Landscaping Project because of the close proximity of the projects. Additionally, a review of available information indicates that the project has not been contaminated by LLNL activities since the previous sampling.

The analytical data indicate the soil is not radioactive according to current Department of Energy (DOE) and LLNL radioactive waste criteria. The analytical data show the concentrations of metals are below hazardous waste criteria. The data does indicate the soil contains trace amounts of volatile organic compounds (VOCs); however, since methylene chloride was also detected in the method blank, its presence in the sample analytical is likely a result of laboratory contamination. Based on the information gathered, it has been determined that the soil does not meet any of the federal or state regulatory criteria for a listed or characteristic hazardous waste as published in 40 CFR 261, 40 CFR 761, and 22 CCR 66261. Additionally, total metal concentrations are below LLNL-established levels for reuse onsite. Assuming that no contamination (e.g., discolored soil, odors, etc.) is detected during soil excavation or hauling operations, the soil is classified as non-radioactive and non-hazardous.

Please provide a copy of the attached Altamont Landfill Waste Profile to your driver(s) for each load brought to the landfill.

If you have any questions about disposition of this soil, please contact me at extension 2-6343 or pager 61496.

Attachment: Altamont Landfill Profile #608105CA Waste Acceptance Form

DISTRIBUTION LIST:

TITLE:	NAME (LAST, FIRST):	METHOD OF DELIVERY:
ES&H Team Leader:	Simpson, Tracey	Simpson9@llnl.gov
	Burklin, Ralph	Burklin1@llnl.gov
	Doman, Jennifer	Doman3@llnl.gov P2data@llnl.gov
	Lavinsky, Dave	Lavinsky1@llnl.gov
	Maciel, Bill	Maciel3@llnl.gov
	Meredith, Russ	Meredith9@llnl.gov
	Pascual, Prennie	Pascual3@llnl.gov
	Rubio, Manny	Rubio1@llnl.gov
	Woods, Joe	Woods10@llnl.gov
	White, Ron	White246@llnl.gov
Archive (hardcopy): ES&H Team 2		

ALTAMONT LANDFILL

WASTE ACCEPTANCE FORM

To be completed by carrier prior to arrival at landfill!

Carrier Name:_____

Truck #:_____ Trailer #:_____

PROFILE: 608105CA

CUSTOMER: Lawrence Livermore National Laboratory

MATERIAL: *Class II Cover RGC*

MANIFEST: (Use "WAC" if manifest is not used for load)

ORIGIN: Livermore

GENERATOR: *Lawrence Livermore National Laboratory*

FLAG COLOR: Yellow

The Information listed above is necessary for acceptance of special waste at the Altamont Landfill.

- **A copy of this form must be presented with each load to the Altamont Landfill scale house collector.**
- **This form is for Altamont Landfill waste tracking use and is not intended to serve as a customer shipping document.**
- **Drivers will receive a weight ticket for confirmation of disposal.**
- **An alternative shipping record may be used in lieu of this form if it includes the above information.**
- **If shipping form is a multiple part form, please notify landfill of which copies to return with the driver, if not otherwise noted on the form.**

Interdepartmental letterhead

Mail Station L- 509

Ext. 3-8336

Environment, Safety & Health
ES&H Team 2

February 6, 2012
ESH-T2-12-025

MEMORANDUM

To: Mike Petrangelo

From: Lisa Crawford, Environmental Analyst, ES&H Team 2 KD for LC

Subject: *Management of Soil from the Building 482 Landscaping Project*
Location: Northeast Side and West End of Building
Sample Numbers: PC-B490-005-01-01-SC-3U

The thirty cubic yards of soil excavated from this project area meets all environmental reuse requirements; however, there is currently no use for this soil onsite. Therefore, the soil has been evaluated for disposal at the Altamont Landfill.

Analytical data, from the Building 490 (B-490) Landscaping Project obtained on May 13, 2011, were used to characterize soil from the Building 482 (B-482) Landscaping Project. These data are submitted as representative data for the B-482 Landscaping Project because of the close proximity of the projects. Additionally, a review of available information indicates that the project has not been contaminated by LLNL activities since the previous sampling.

The analytical data indicate the soil is not radioactive according to current Department of Energy (DOE) and LLNL radioactive waste criteria. The analytical data show the concentrations of metals are below hazardous waste criteria. The data does indicate the soil contains trace amounts of volatiles organic compounds (VOCs); however, since methylene chloride was also detected in the method blank, its presence in the sample analytical is likely a result of laboratory contamination. Based on the information gathered, it has been determined that the soil does not meet any of the federal or state regulatory criteria for a listed or characteristic hazardous waste as published in 40 CFR 261, 40 CFR 761, and 22 CCR 66261. Additionally, total metal concentrations are below LLNL-established levels for reuse onsite. Assuming that no contamination (e.g., discolored soil, odors, etc.) is detected during soil excavation or hauling operations, the soil is classified as non-radioactive and non-hazardous.

Please provide a copy of the attached Altamont Landfill Waste Profile to your driver(s) for each load brought to the landfill.

If you have any questions about disposition of this soil, please contact me at extension 2-6343 or pager 61496.

Attachment: Altamont Landfill Profile #608108CA Waste Acceptance Form

DISTRIBUTION LIST:

TITLE:	NAME (LAST, FIRST):	METHOD OF DELIVERY:
ES&H Team Leader:	Simpson, Tracey	Simpson9@llnl.gov
	Doman, Jennifer	Doman3@llnl.gov P2data@llnl.gov
	Lavinsky, Dave	Lavinsky1@llnl.gov
	Macchioni, Barbara	Macchioni1@llnl.gov
	Maciel, Bill	Maciel3@llnl.gov
	Meredith, Russ	Meredith9@llnl.gov
	Pascual, Prennie	Pascual3@llnl.gov
	Rubio, Manny	Rubio1@llnl.gov
	Woods, Joe	Woods10@llnl.gov
	White, Ron	White246@llnl.gov
Archive (hardcopy): ES&H Team 2		

ALTAMONT LANDFILL

WASTE ACCEPTANCE FORM

To be completed by carrier prior to arrival at landfill!

Carrier Name:_____

Truck #:_____ Trailer #:_____

PROFILE: 608105CA

CUSTOMER: Lawrence Livermore National Laboratory

MATERIAL: *Class II Cover RGC*

MANIFEST: (Use "WAC" if manifest is not used for load)

ORIGIN: Livermore

GENERATOR: *Lawrence Livermore National Laboratory*

FLAG COLOR: Yellow

The Information listed above is necessary for acceptance of special waste at the Altamont Landfill.

- **A copy of this form must be presented with each load to the Altamont Landfill scale house collector.**
- **This form is for Altamont Landfill waste tracking use and is not intended to serve as a customer shipping document.**
- **Drivers will receive a weight ticket for confirmation of disposal.**
- **An alternative shipping record may be used in lieu of this form if it includes the above information.**
- **If shipping form is a multiple part form, please notify landfill of which copies to return with the driver, if not otherwise noted on the form.**

Interdepartmental Letter
Environment, Safety & Health
ES&H Team 2

Mail Station L-509

Extension 3-8336

August 1, 2012
ESH-T2-12-169

MEMORANDUM

To: Greg Sherman

From: Sabre Coleman

Subject: *Disposition of Soil from Pier Installation Project*
Location of Project: West of Building 131
Sample Number: PC-B131-012-01-01-SC-3U

This memo supersedes document ESH-T2-12-168. Please disregard the previous memo and use the information contained in this revision.

The approximately 18 cubic yards of soil excavated from this project area meet all environmental reuse requirements and may be reused in the project area or elsewhere on site.

Analytical data, from the Building 131 (B-131) Landscape Courtyard Project obtained on September 29, 2004, were used to characterize soil from the B-131 Pier Installation Project. These data are submitted as representative data because of the close proximity of the projects. Additionally, a review of available information indicates that the project has not been contaminated by LLNL activities since the previous sampling.

The analytical data indicates the soil is not radioactive according to current Department of Energy (DOE) and LLNL radioactive waste criteria and the soil does not contain detectable concentrations of volatile organic compounds (VOCs). Based on the information gathered, it has been determined that the soil does not meet any of the federal or state regulatory criteria for a listed or characteristic hazardous waste as published in 40 CFR 261, 40 CFR 761, and 22 CCR 66261. In addition, total metals concentrations are below LLNL-established levels for reuse onsite.

Assuming that no contamination (e.g., discolored soil, odors, etc.) is detected during excavation operations, the soil is classified as non-radioactive and non-hazardous and may be reused onsite. However, if it is subsequently determined that the soil does not meet design requirements, or if contamination is found during excavation or soil hauling operations, please contact me so I can provide you with the guidance necessary to characterize and manage the suspected contaminated soil and/or provide the necessary forms and procedures for disposal at an appropriate landfill.

If you have any questions about disposition of this soil, please contact Sabre Coleman at extension 2-3430 or pager 04522.

Sabre Coleman, Environmental Analyst
ES&H Team 2

Peer reviewed by Lisa Crawford

Copy:

Adams, Chris	adams2@llnl.gov
Crawford, Lisa	crawford25@llnl.gov
Doman, Jennifer	doman3@llnl.gov / P2data@llnl.gov
Jacobson, Butch	jacobson3@llnl.gov
Goodwin, Kevin	goodwin20@llnl.gov
Lavinsky, David	lavinsky1@llnl.gov
Maciel, Bill	maciel3@llnl.gov
Rey, Manny	rey3@llnl.gov
Rubio, Manny	rubio1@llnl.gov
Sachau, Dan	sachau1@llnl.gov
Simpson, Tracey CMAS for TS	simpson9@llnl.gov
Woods, Joe	woods10@llnl.gov

Keywords: B131 EA Soil, Asphalt, Concrete 2012 file, Dig Permit # 016533

Appendix P

Building 419 Post-excavation Confirmation Sampling

Building 419 Post-excavation Confirmation Sampling

Overview

Four areas were identified for soil removal. Following soil removal, nine samples were collected from each area to provide additional statistically based confidence that the soil removal was sufficient. This appendix how the number and placement of confirmation samples was determined, and how the analytical results were subsequently used. The approach was based on methods in the Multi-Agency Radiation Source and Site Investigation Manual (MARSSIM; US EPA, 2000).

Statistical methodology

Following discussions with the DTSC, it was determined that confirmation would be based on statistical tests, either the Wilcoxon Rank Sum (WRS) test or the Sign test, depending on factors described below. The tests were to be implemented as described in MARSSIM. For the WRS test, the randomized LLNL site-wide background samples collected earlier in the B419 project (Appendix H) would be used as the reference area.

The sampling design assumed that statistical tests would use the conservative assumption that an excavation site does not meet acceptability criterion:

H_o: The excavation site does not meet acceptability criterion

H_a: The excavation site meets acceptability criterion

Since 100% sampling is not possible, there is always and unavoidably some uncertainty about the decision. Two types of errors are possible: incorrectly rejecting H_o or incorrectly accepting H_o. These are generally referred to as Type I and Type II errors respectively. In everyday language, the Type I error consists of deciding an excavation site is not contaminated when in fact it is; the Type II error consists of deciding an excavation site is contaminated when in fact it not. The power of a statistical test is the probability of correctly rejecting the null hypothesis. The significance level is the probability of incorrectly rejecting the null hypothesis. Table A-1 illustrates these relationships.

Table A-1. Hypothesis test error definitions.

	Decision based on statistical test	
True condition of excavation site	**Does not meet criterion**	**Meets criterion**
Does not meet criterion (H_o is true)	Correct decision (Probability = $1-\alpha$)	*Incorrect* rejection of H_o (Probability = α)
Meets criterion (H_o is false)	*Incorrect* acceptance of H_o (Probability = β)	Correct decision (Power = $1-\beta$)

Number of confirmation samples

The methods described in this section were used to calculate the number of required samples separately for each analyte. The final number of confirmation samples was the largest among them. Before calculating the number of samples, the site history and characterization data were reviewed and appropriate analytes and their respective screening limits (SLs) were selected.

In order to calculate the required number of samples, MARSSIM defines two values: the derived concentration guideline level (DCGL; also referred to as the upper bound of the gray region, or UBGR) and the lower bound of the gray region (LBGR). The interval between them is called "gray" because decision uncertainty is larger within the interval than outside it.

The LBGR, the DCGL, α, and power are inputs to the statistical design. These, together with an estimated standard deviation (*s*), determine the number of required samples. The width of the gray region (DCGL-LBGR) is referred to as delta (Δ). Delta divided by the standard deviation $\left(\Delta/s\right)$ is referred to as the relative shift. MARSSIM recommends that that the relative shift should be between 1 and 3.

The sign test is used when the analyte is not present in the background, or present in the background at only a small fraction of the DCGL. The sign test is also used when fewer than 40% of the background samples are detections, because the WRS test cannot be performed with a large proportion of non-detections. Otherwise, the WRS is used.

For the following sample size calculations, the standard deviation was estimated from the reference data if possible, otherwise it was estimated from B419 site-specific characterization samples. The LBGR was set at the median of the reference samples, if possible, otherwise at the median of site-specific characterization samples. Summary statistics calculated from B419 site-specific characterization samples do not include any results above their respective SLs or non-detections with a reporting limit above the SL. The DCGL was set at the SL. The Type I error rate, α, was set at 0.1, and the power at 0.9, for both the WRS and sign tests.

Formulas and methods for calculating the number of samples are found in MARSSIM and NRC 1998, as well as the VSP and MARSSIM Methodology section below. Sample size calculations were performed using MARSSIM module of Visual Sample Plan (VSP) software (VSP 2012).

Results for analytes using the WRS test are summarized in the Table A-2. All calculations use the reference data.

Table A-2. Required number of samples based on the WRS methodology.

Constituent	N of detections	N of samples	LBGR	DCGL	Std. Dev.	Units	Relative shift	WRS N
Arsenic	35	35	4.1	11	1.21	mg/kg	5.59	6
Chromium	35	35	29	48.9	10.6	mg/kg	1.8	9
Vanadium	35	35	29	78	5.76	mg/kg	8.72	6
Gross alpha	21	35	2.08	3.38	0.405	pCi/g	3.11	6
Gross beta	30	35	2.8	4.47	0.611	pCi/g	2.83	6

Results for analytes using the sign test are summarized in Table A-3. Analytes for which a sample size cannot be calculated are indicated by “NA” in Table A-3. They were tested using the sign test relative to their respective DCGLs.

- Hexavalent chromium had no detections in either the reference data or the B419 Site characterization samples, so the standard deviation cannot be estimated and a sample size cannot be calculated.

- The LBGR for mercury estimated from the reference data was only a small fraction of the DCGL.

- Thallium had no detections in the reference data, and only one detection in the B419 Site characterization samples, so the standard deviation cannot be estimated and a sample size cannot be calculated.

- PCB 1248 was not analyzed for in the reference data and had only one detection in the B419 Site characterization samples, so the standard deviation cannot be estimated and a sample size cannot be calculated.

- PCB 1254 was not analyzed for in the reference data, so the LBGR and standard deviation are estimated from B419 Site characterization samples. The resulting LBGR was only a small fraction of the DCGL.

Table A-3. Required number of samples based on the sign test methodology.

Constituent	N of detections	N of samples	LBGR	DCGL	Std. Dev.	Units	Relative shift	Sign test N
Hexavalent Chromium	0	35	NA	2.2	NA	mg/kg	NA	NA
Mercury	23	35	0.044	10	0.0181	mg/kg	550	9
Thallium	0	35	NA	5	NA	mg/kg	NA	NA
PCB 1248	1	212	NA	0.22	NA	mg/kg	NA	NA
PCB 1254	13	212	0.00498	0.22	0.017	mg/kg	12.3	9

As mentioned above, MARSSIM recommends that the relative shift should be between 1 and 3. It also suggests that when the relative shift is greater than three the LBGR should be adjusted upward to reduce the relative shift to a value no larger than three. The sample sizes shown in Tables A-2 and A-3 apply this adjustment, but the show the original LBGR and relative shift.

Chromium had the smallest relative shift and therefore the largest required number of samples, nine. The number of samples to be collected in each excavation site was nine.

Interpretation of confirmation sampling results

Based on discussions with the DTSC, the following steps were used to evaluate the confirmation sampling results.

1. If the average of the results is greater than the SL, the excavation area does not meet the acceptance criterion. No statistical test is performed.

2. If all of the individual results are below the SL, the excavation area meets the acceptance criterion. No statistical test is performed.

3. If one or more individual results is above the SL and the average is below the SL, then the WRS test or sign test is performed.

As mentioned above, the WRS and sign tests were conducted as described in MARSSIM (see MARSSIM Sections 8.3 and 8.4).

It should also be noted that the MARSSIM WRS methodology is designed to use the same number of samples in the reference area as in the “survey” area (the excavation site). For B419, there are 35 reference area samples, more than the required 9. This gave the WRS test additional power.

Sample Locations and Maps

This section provides tables of sampling location coordinates and maps showing their locations, for each of the four excavation sites. The maps are “unfolded” views of each excavation pit. In the center of each map is the bottom (or “floor”) of each pit. Walls are numbered clockwise from the top. The grid of small dots in each map indicates 1 foot spacing. The red dot in each map indicates the local origin (0,0) of the sampling location

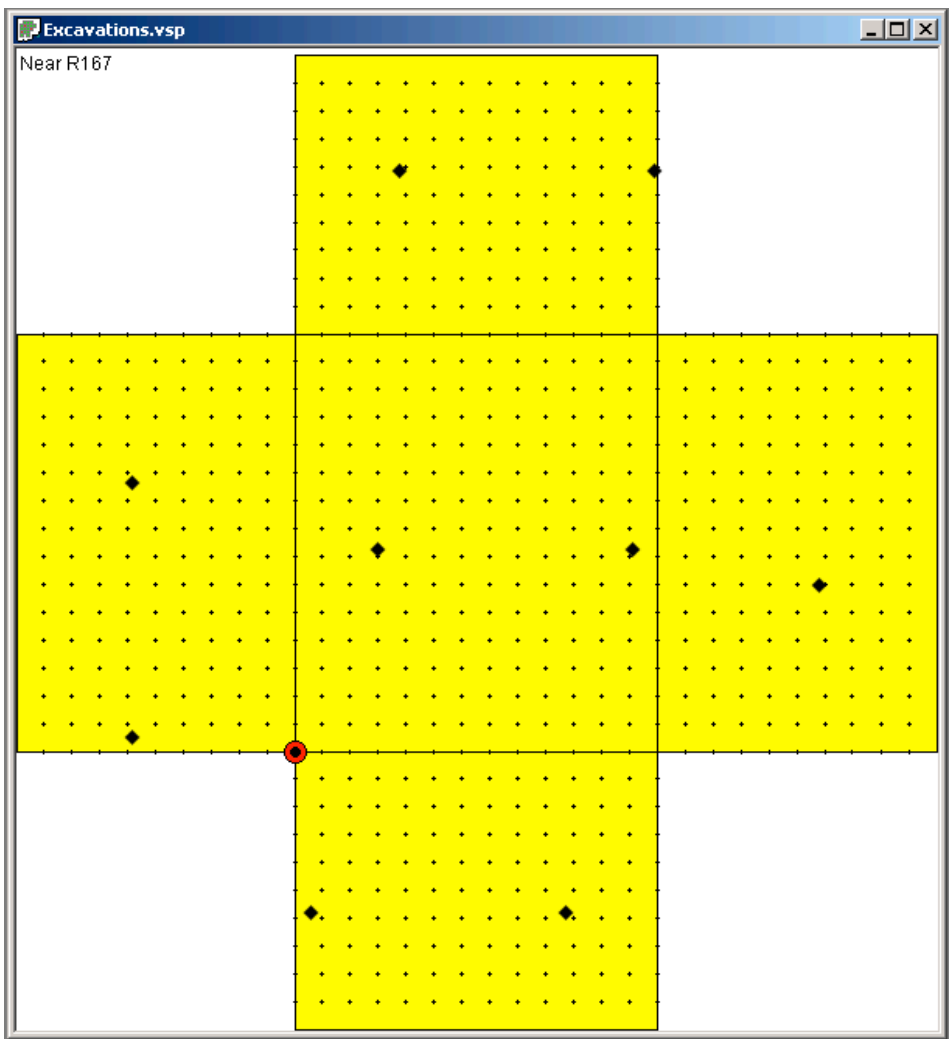
coordinates relative to the excavation pit. The true site coordinates of each local origin are given below. Coordinates are listed with precision as calculated by VSP, and may be rounded off as necessary for practical use in the field.

When placing a regularly spaced grid over a geometric shape it is not always possible to position the grid so that the number of grid points within the shape exactly matches the desired number of sampling locations. The VSP sampling design report refers to this as "grid edge effects."

Excavation site Near R167

Sampling coordinates in the table below are relative to the “lower left” corner of the excavation at (X,Y) = (10992,9058), indicated by the red dot in the figure. Z coordinates are relative to the “floor” (bottom) of the 10 ft deep excavation.

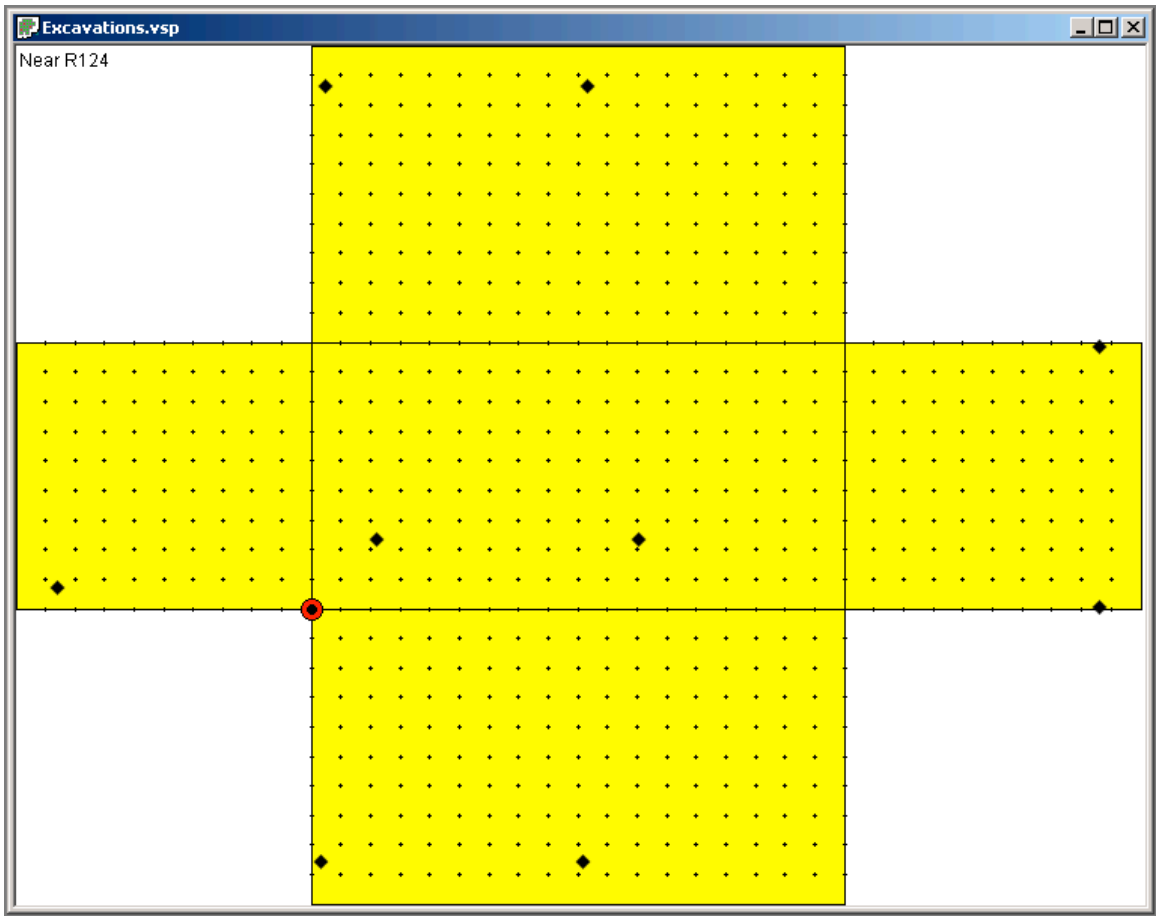
X Coord	Y Coord	Z Coord	Surface
2.9961	7.2283	0.0000	Floor
12.1551	7.2283	0.0000	Floor
0.5993	0.0000	5.8184	Wall 3
9.7583	0.0000	5.8184	Wall 3
13.0000	5.9174	5.8184	Wall 2
12.9235	15.0000	5.8184	Wall 1
3.7644	15.0000	5.8184	Wall 1
0.0000	9.6053	5.8184	Wall 4
0.0000	0.4462	5.8184	Wall 4



Excavation site Near R124

Sampling coordinates in the table below are relative to the “lower left” corner of the excavation at (X,Y) = (10983,8974), indicated by the red dot in the figure below. Z coordinates are relative to the “floor” (bottom) of the 10 ft deep excavation.

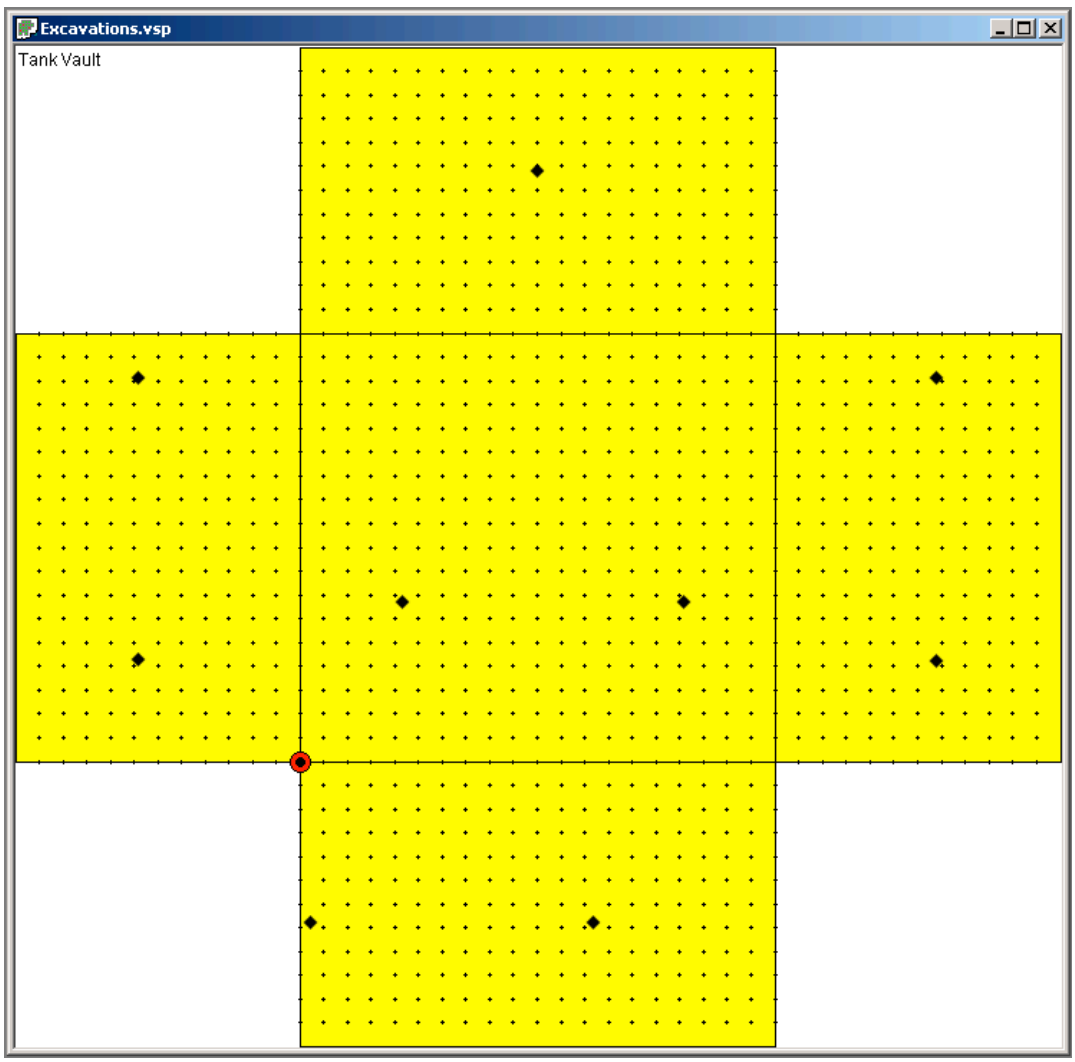
X Coord	Y Coord	Z Coord	Surface
2.2166	2.2890	0.0000	Floor
11.0484	2.2890	0.0000	Floor
0.3473	0.0000	8.5995	Wall 3
9.1791	0.0000	8.5995	Wall 3
18.0000	0.0109	8.5995	Wall 2
18.0000	8.8426	8.5995	Wall 2
9.3256	9.0000	8.5995	Wall 1
0.4939	9.0000	8.5995	Wall 1
0.0000	0.6621	8.5995	Wall 4



Excavation site Tank Vault

Sampling coordinates in the table below are relative to the “lower left” corner of the excavation at (X,Y) = (10947,8934), indicated by the red dot in the figure below. Z coordinates are relative to the “floor” (bottom) of the 12 ft deep excavation.

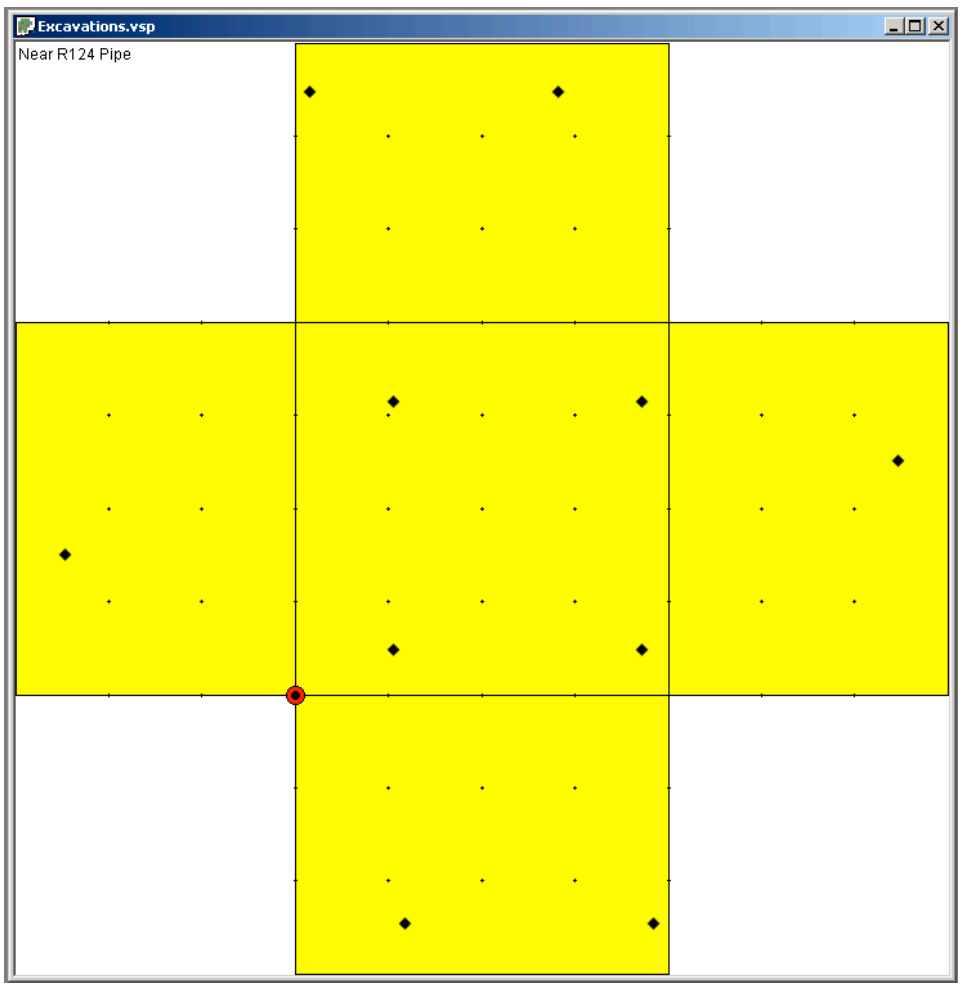
X Coord	Y Coord	Z Coord	Surface
4.2947	6.6936	0.0000	Floor
16.1831	6.6936	0.0000	Floor
0.4383	0.0000	6.8005	Wall 3
12.3266	0.0000	6.8005	Wall 3
20.0000	4.2150	6.8005	Wall 2
20.0000	16.1034	6.8005	Wall 2
10.0083	18.0000	6.8005	Wall 1
0.0000	16.1199	6.8005	Wall 4
0.0000	4.2315	6.8005	Wall 4



Excavation site Near R124 Pipe

Sampling coordinates in the table below are relative to the “lower left” corner of the excavation at (X,Y) = (10976,8953), indicated by the red dot in the figure below. Z coordinates are relative to the “floor” (bottom) of the 3 ft deep excavation. The VSP software generated 10 sampling locations due to grid edge effects.

X Coord	Y Coord	Z Coord	Surface
1.0569	0.4723	0.0000	Floor
3.7236	0.4723	0.0000	Floor
1.0569	3.1389	0.0000	Floor
3.7236	3.1389	0.0000	Floor
1.1754	0.0000	2.4615	Wall 3
3.8420	0.0000	2.4615	Wall 3
4.0000	2.5087	2.4615	Wall 2
2.8246	4.0000	2.4615	Wall 1
0.1580	4.0000	2.4615	Wall 1
0.0000	1.4913	2.4615	Wall 4



Sampling and analytical methods

The confirmation sampling included all TTLC metals listed in method SW 6010, and gross alpha and beta using the method 9310, at all four soil excavation areas. The confirmatory samples from the excavation near the Tank Vault were also be analyzed for PCB 1248 and PCB 1254 using the method SW 8082. The confirmatory samples from the excavation near Room 167 was also analyzed for the same two arachlors using SW 8082 and Hexavalent Chromium using method 3060A-7196. In addition, one sample from the bottom of each of the four excavations was analyzed for tritium using method 906EPSM, to provide additional information for the CERCLA program in the future.

Evaluation of confirmation sampling results

The following sections describe the evaluation of the confirmation sampling results.

Reporting limits exceeding the DCGL.

Following the three steps described above in the “Interpretation of confirmation sampling results” section is simple and straightforward when all results are considered to be detections. Following the steps is also straightforward when there are non-detections and the reporting limits (RLs) are all less than the DCGL (SL), because in this case the Step 2 comparison with the DCGL can be performed. However, in some instances the analytical laboratory performed dilutions, causing the RL to exceed the DCGL, in which case the Step 2 evaluation cannot be performed using the RL.

Two approaches were used to deal with this problem. One was to use “worst case” - “best case” analyses; the other was to use method detection limits (MDLs) instead of RLs.

For Step 1, a “best case” sample average can be calculated by using zero for all NDs; this is the lowest the average can possibly be. The “worst case” average consisting of calculating the average using RL as if it were an actual reported concentration. This is the largest the average can possibly be. If the maximum possible average was below the DCGL, then the constituent passes Step 1 and can proceed to Step 2. If the lowest possible average was greater than the DCGL, then the constituent fails at Step 1 (and no further steps are needed). If the DCGL was between the two values no determination can be made, and the evaluation proceeds to Step 2.

The analytical laboratory also reported its MDLs. Provided that the MDL is also below the DCGL, a non-detection at the MDL level (a “U” flag) indicates a result below the DCGL, and the Step 2 comparison can be performed. In some cases the laboratory reported an estimated concentration between the MDL and the RL (a “B” flag). Such estimates are not as well quantified as results above the laboratory’s practical quantitation limit (not available), but can be used for comparison with the DCGL. When Step 2 could not be performed due to RLs above the DCGL, Step 2 was performed using MDLs and estimated concentrations between the MDL and RL.

It is also possible to perform a worst-case sign test by treating RLs as if they were detections at the RL. With nine samples, a constituent passes the sign test if at least seven of them are below the DCGL (assuming no ties). If all nine results are ND, and seven of them have an RL that was less than the DCGL, then at least seven results are below the DCGL and the constituent passes. Although it is unknown whether the other two are above the DCGL, the constituent passes even if they are above the DCGL.

Statistical evaluation results

With one exception, all sets of data met the acceptance criterion.

PCB 1254 had 7 non-detections and 2 detections. The two detections, however, had concentrations of 390 µg/kg and 4000 µg/kg, both exceeding the DCGL of 220 µg/kg (and in one instance by a great deal). The minimum possible average was 488 µg/kg which exceeds the DCGL. The data set does not meet the acceptance criterion according to Step 1.

Non-statistical evaluation results

DOE/LLNL also analyzed soil samples from all 36 confirmation sampling locations for lead. The confirmation results are similar to the previous soil characterization sampling results. The results for lead range from 3.9 mg/kg to 250 mg/kg, with an average value of 16.4 mg/kg. The distribution of lead in soil does not indicate a localized area with elevated lead concentrations (a hot spot). LLNL followed the guidance described in DTSC's Human Health Risk Assessment Note Number 4 (DTSC HERO HHRA Note 4, June 9, 2011) for lead and determined that the 95% Upper Confidence Level for the lead data was 28.5 mg/kg. This value was below the screening levels of 80 mg/kg for residential and 320 mg/kg for industrial/commercial exposure scenarios. When all (characterization and confirmation) soil results for lead are analyzed together, the 95% UCL for lead remains below the screening level at 18.4 mg/kg.

Evaluation details

The following tables show details from the three statistical evaluation steps. In most cases, a conclusion was reached on Step 2, that is, all of the analytical results were below the DCGL. For each excavation site, the constituents identified in the sampling plan as using the WRS are presented first. The tables include the calculated test statistic (T) and its critical value (Tcrit), for constituents for which a statistical test was performed (Step 3).

Results for R124 excavation:

Constituents assigned to the WRS test in the sampling plan:

Constituent	N detected	N	Average	Low avg	High avg	DCGL	T	Tcrit	Result	Evaluation
Arsenic (mg/kg)	9	9	3.49	NA	NA	11.00	NA	NA	pass	all below (all hits)
Chromium (mg/kg)	9	9	27.90	NA	NA	48.90	NA	NA	pass	all below (all hits)
Vanadium (mg/kg)	9	9	26.40	NA	NA	78.00	NA	NA	pass	all below (all hits)
Gross alpha (pCi/g)	9	9	1.56	NA	NA	3.38	NA	NA	pass	all below (all hits)
Gross beta (pCi/g)	9	9	2.21	NA	NA	4.47	NA	NA	pass	all below (all hits)

Constituents assigned to the sign test in the sampling plan:

Constituent	N detected	N	Average	Low avg	High avg	DCGL	T	Tcrit	Result	Evaluation
Mercury (mg/kg)	6	9	0.0423	0.0337	0.0458	10	NA	NA	pass	all below (including RL)
Thallium (mg/kg)	0	9	NA	0.0000	2.0000	5	NA	NA	pass	all below (using MDL)

Results for R124Pipe excavation:

Constituents assigned to the WRS test in the sampling plan:

Constituent	N detected	N	Average	Low avg	High avg	DCGL	T	Tcrit	Result	Evaluation
Arsenic (mg/kg)	9	9	3.62	NA	NA	11.00	NA	NA	pass	all below (all hits)
Chromium (mg/kg)	9	9	28.00	NA	NA	48.90	NA	NA	pass	all below (all hits)
Vanadium (mg/kg)	9	9	25.80	NA	NA	78.00	NA	NA	pass	all below (all hits)
Gross alpha (pCi/g)	9	9	2.01	NA	NA	3.38	932	832	pass	WRS test
Gross beta (pCi/g)	9	9	2.83	NA	NA	4.47	918	832	pass	WRS test

Constituents assigned to the sign test in the sampling plan:

Constituent	N detected	N	Average	Low avg	High avg	DCGL	T	Tcrit	Result	Evaluation
Mercury (mg/kg)	8	9	0.262	0.26	0.264	10	NA	NA	pass	all below (including RL)
Thallium (mg/kg)	0	9	NA	0.00	1.960	5	NA	NA	pass	all below (using MDL)

Results for R167 excavation:

Constituents assigned to the WRS test in the sampling plan:

Constituent	N detected	N	Average	Low avg	High avg	DCGL	T	Tcrit	Result	Evaluation
Arsenic (mg/kg)	9	9	4.29	NA	NA	11.00	NA	NA	pass	all below (all hits)
Chromium (mg/kg)	9	9	48.40	NA	NA	48.90	940	832	pass	WRS test
Vanadium (mg/kg)	9	9	34.60	NA	NA	78.00	NA	NA	pass	all below (all hits)
Gross alpha (pCi/g)	9	9	3.23	NA	NA	3.38	932	832	pass	WRS test
Gross beta (pCi/g)	9	9	4.01	NA	NA	4.47	945	832	pass	WRS test

Constituents assigned to the sign test in the sampling plan:

Constituent	N detected	N	Average	Low avg	High avg	DCGL	T	Tcrit	Result	Evaluation
Hexavalent Chromium (mg/kg)	1	9	NA	0.244	2.26	2.2	NA	NA	pass	all below (using MDL)
Mercury (mg/kg)	9	9	0.524	NA	NA	10.0	NA	NA	pass	all below (all hits)
Thallium (mg/kg)	0	9	NA	0.000	2.13	5.0	NA	NA	pass	all below (including RL)
PCB 1248 (µg/kg)	0	9	NA	0.000	50.40	220.0	NA	NA	pass	all below (including RL)
PCB 1254 (µg/kg)	2	9	NA	65.900	95.40	220.0	8	6	pass	Sign test

Results for TankVault excavation:

Constituents assigned to the WRS test in the sampling plan:

Constituent	N detected	N	Average	Low avg	High avg	DCGL	T	Tcrit	Result	Evaluation
Arsenic (mg/kg)	9	9	2.87	NA	NA	11.00	NA	NA	pass	all below (all hits)
Chromium (mg/kg)	9	9	27.60	NA	NA	48.90	NA	NA	pass	all below (all hits)
Vanadium (mg/kg)	9	9	20.60	NA	NA	78.00	NA	NA	pass	all below (all hits)
Gross alpha (pCi/g)	9	9	1.52	NA	NA	3.38	NA	NA	pass	all below (all hits)
Gross beta (pCi/g)	9	9	1.98	NA	NA	4.47	NA	NA	pass	all below (all hits)

Constituents assigned to the sign test in the sampling plan:

Constituent	N detected	N	Average	Low avg	High avg	DCGL	T	Tcrit	Result	Evaluation
Mercury (mg/kg)	9	9	0.168	NA	NA	10	NA	NA	pass	all below (all hits)
Thallium (mg/kg)	2	9	NA	0.244	1.31	5	NA	NA	pass	all below (including RL)
PCB 1248 (µg/kg)	0	9	NA	0.000	243.00	220	8	6	pass	Sign test with RL above DCGL (worst case)
PCB 1254 (µg/kg)	2	9	NA	488.000	515.00	220	NA	NA	fail	minimum possible avg above DCGL

References

U.S. EPA, 2000, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575 Rev. 1, EPA 402-R-97-016 Rev. 1, DOE/EH-0624 Rev. 1.

Nuclear Regulatory Commission (NRC), 1998, A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys, NUREG-1505.

VSP Development Team (2012). *Visual Sample Plan: A Tool for Design and Analysis of Environmental Sampling* Version 6.2d. Pacific Northwest National Laboratory. Richland, WA. http://vsp.pnnl.gov.

Appendix Q

Confirmation Sampling Results

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-101	10	Arsenic		3.4	mg/kg	11	
B-419-CONF-101	10	Arsenic		3.7	mg/kg	11	
B-419-CONF-101	10	Barium		130	mg/kg	15000	
B-419-CONF-101	10	Barium		160	mg/kg	15000	
B-419-CONF-101	10	Chromium		32	mg/kg	48.9	
B-419-CONF-101	10	Chromium		33	mg/kg	48.9	
B-419-CONF-101	10	Cobalt		7.2	mg/kg	660	
B-419-CONF-101	10	Cobalt		7.8	mg/kg	660	
B-419-CONF-101	10	Copper		17	mg/kg	3100	
B-419-CONF-101	10	Copper		18	mg/kg	3100	
B-419-CONF-101	10	Gross beta		2.1	pCi/g	4.47	
B-419-CONF-101	10	Gross beta		3.11	pCi/g	4.47	
B-419-CONF-101	10	Hexavalent Chromium	<	2.2	mg/kg	2.2	Y*
B-419-CONF-101	10	Lead		6.2	mg/kg	400	
B-419-CONF-101	10	Lead		7.6	mg/kg	400	
B-419-CONF-101	10	Mercury		0.41	mg/kg	10	
B-419-CONF-101	10	Mercury		0.53	mg/kg	10	
B-419-CONF-101	10	Nickel		35	mg/kg	1500	
B-419-CONF-101	10	Nickel		36	mg/kg	1500	
B-419-CONF-101	10	PCB 1254		0.04	mg/kg	0.22	
B-419-CONF-101	10	PCB 1254		0.043	mg/kg	0.22	
B-419-CONF-101	10	Selenium		0.86	mg/kg	390	
B-419-CONF-101	10	Tritium		231	pCi/g	110	Y
B-419-CONF-101	10	Tritium		412	pCi/g	110	Y
B-419-CONF-101	10	Vanadium		23	mg/kg	390	
B-419-CONF-101	10	Vanadium		29	mg/kg	390	
B-419-CONF-101	10	Zinc		33	mg/kg	23000	
B-419-CONF-101	10	Zinc		36	mg/kg	23000	
B-419-CONF-102	10	Arsenic		5.5	mg/kg	11	
B-419-CONF-102	10	Barium		240	mg/kg	15000	
B-419-CONF-102	10	Beryllium		0.79	mg/kg	160	
B-419-CONF-102	10	Chromium		56	mg/kg	48.9	Y
B-419-CONF-102	10	Cobalt		12	mg/kg	660	
B-419-CONF-102	10	Copper		30	mg/kg	3100	
B-419-CONF-102	10	Gross alpha		3.7	pCi/g	3.38	Y
B-419-CONF-102	10	Gross beta		2.52	pCi/g	4.47	
B-419-CONF-102	10	Hexavalent Chromium	<	2.4	mg/kg	2.2	Y*
B-419-CONF-102	10	Lead		40	mg/kg	400	
B-419-CONF-102	10	Mercury		0.75	mg/kg	10	
B-419-CONF-102	10	Nickel		57	mg/kg	1500	
B-419-CONF-102	10	Vanadium		35	mg/kg	390	
B-419-CONF-102	10	Zinc		51	mg/kg	23000	
B-419-CONF-103	4.2	Arsenic		3.4	mg/kg	11	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-103	4.2	Barium		180	mg/kg	15000	
B-419-CONF-103	4.2	Beryllium		1.5	mg/kg	160	
B-419-CONF-103	4.2	Chromium		66	mg/kg	48.9	Y
B-419-CONF-103	4.2	Cobalt		11	mg/kg	660	
B-419-CONF-103	4.2	Copper		19	mg/kg	3100	
B-419-CONF-103	4.2	Gross alpha		3.3	pCi/g	3.38	
B-419-CONF-103	4.2	Gross beta		4	pCi/g	4.47	
B-419-CONF-103	4.2	Hexavalent Chromium	<	2.2	mg/kg	2.2	Y*
B-419-CONF-103	4.2	Lead		13	mg/kg	400	
B-419-CONF-103	4.2	Mercury		0.42	mg/kg	10	
B-419-CONF-103	4.2	Nickel		48	mg/kg	1500	
B-419-CONF-103	4.2	Vanadium		33	mg/kg	390	
B-419-CONF-103	4.2	Zinc		46	mg/kg	23000	
B-419-CONF-104	4.2	Arsenic		5.5	mg/kg	11	
B-419-CONF-104	4.2	Barium		190	mg/kg	15000	
B-419-CONF-104	4.2	Chromium		54	mg/kg	48.9	Y
B-419-CONF-104	4.2	Cobalt		13	mg/kg	660	
B-419-CONF-104	4.2	Copper		24	mg/kg	3100	
B-419-CONF-104	4.2	Gross alpha		2.9	pCi/g	3.38	
B-419-CONF-104	4.2	Gross beta		4.1	pCi/g	4.47	
B-419-CONF-104	4.2	Hexavalent Chromium	<	2.6	mg/kg	2.2	Y*
B-419-CONF-104	4.2	Lead		9.9	mg/kg	400	
B-419-CONF-104	4.2	Mercury		0.22	mg/kg	10	
B-419-CONF-104	4.2	Nickel		55	mg/kg	1500	
B-419-CONF-104	4.2	Vanadium		39	mg/kg	390	
B-419-CONF-104	4.2	Zinc		48	mg/kg	23000	
B-419-CONF-105	4.2	Arsenic		4	mg/kg	11	
B-419-CONF-105	4.2	Barium		190	mg/kg	15000	
B-419-CONF-105	4.2	Beryllium		1.1	mg/kg	160	
B-419-CONF-105	4.2	Chromium		34	mg/kg	48.9	
B-419-CONF-105	4.2	Cobalt		10	mg/kg	660	
B-419-CONF-105	4.2	Copper		21	mg/kg	3100	
B-419-CONF-105	4.2	Gross alpha		3.7	pCi/g	3.38	Y
B-419-CONF-105	4.2	Gross beta		4.5	pCi/g	4.47	Y
B-419-CONF-105	4.2	Hexavalent Chromium	<	2.2	mg/kg	2.2	Y*
B-419-CONF-105	4.2	Lead		14	mg/kg	400	
B-419-CONF-105	4.2	Mercury		1.3	mg/kg	10	
B-419-CONF-105	4.2	Nickel		44	mg/kg	1500	
B-419-CONF-105	4.2	Vanadium		33	mg/kg	390	
B-419-CONF-105	4.2	Zinc		42	mg/kg	23000	
B-419-CONF-106	4.2	Arsenic		4.1	mg/kg	11	
B-419-CONF-106	4.2	Barium		180	mg/kg	15000	
B-419-CONF-106	4.2	Chromium		37	mg/kg	48.9	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-106	4.2	Cobalt		11	mg/kg	660	
B-419-CONF-106	4.2	Copper		22	mg/kg	3100	
B-419-CONF-106	4.2	Gross alpha		2.7	pCi/g	3.38	
B-419-CONF-106	4.2	Gross beta		3.5	pCi/g	4.47	
B-419-CONF-106	4.2	Hexavalent Chromium	<	2.2	mg/kg	2.2	Y*
B-419-CONF-106	4.2	Lead		7.8	mg/kg	400	
B-419-CONF-106	4.2	Mercury		0.073	mg/kg	10	
B-419-CONF-106	4.2	Nickel		51	mg/kg	1500	
B-419-CONF-106	4.2	Vanadium		36	mg/kg	390	
B-419-CONF-106	4.2	Zinc		42	mg/kg	23000	
B-419-CONF-107	4.2	Arsenic		3.9	mg/kg	11	
B-419-CONF-107	4.2	Barium		170	mg/kg	15000	
B-419-CONF-107	4.2	Chromium		46	mg/kg	48.9	
B-419-CONF-107	4.2	Cobalt		10	mg/kg	660	
B-419-CONF-107	4.2	Copper		19	mg/kg	3100	
B-419-CONF-107	4.2	Gross alpha		3.1	pCi/g	3.38	
B-419-CONF-107	4.2	Gross beta		4.1	pCi/g	4.47	
B-419-CONF-107	4.2	Lead		6.8	mg/kg	400	
B-419-CONF-107	4.2	Mercury		0.077	mg/kg	10	
B-419-CONF-107	4.2	Nickel		48	mg/kg	1500	
B-419-CONF-107	4.2	Vanadium		35	mg/kg	390	
B-419-CONF-107	4.2	Zinc		39	mg/kg	23000	
B-419-CONF-108	4.2	Arsenic		5	mg/kg	11	
B-419-CONF-108	4.2	Barium		240	mg/kg	15000	
B-419-CONF-108	4.2	Chromium		60	mg/kg	48.9	Y
B-419-CONF-108	4.2	Cobalt		12	mg/kg	660	
B-419-CONF-108	4.2	Copper		24	mg/kg	3100	
B-419-CONF-108	4.2	Gross alpha		5.2	pCi/g	3.38	Y
B-419-CONF-108	4.2	Gross beta		5.8	pCi/g	4.47	Y
B-419-CONF-108	4.2	Hexavalent Chromium	<	2.2	mg/kg	2.2	Y*
B-419-CONF-108	4.2	Lead		13	mg/kg	400	
B-419-CONF-108	4.2	Mercury		0.48	mg/kg	10	
B-419-CONF-108	4.2	Nickel		56	mg/kg	1500	
B-419-CONF-108	4.2	Vanadium		33	mg/kg	390	
B-419-CONF-108	4.2	Zinc		45	mg/kg	23000	
B-419-CONF-109	4.2	Arsenic		3.5	mg/kg	11	
B-419-CONF-109	4.2	Barium		190	mg/kg	15000	
B-419-CONF-109	4.2	Beryllium		1.1	mg/kg	160	
B-419-CONF-109	4.2	Chromium		51	mg/kg	48.9	Y
B-419-CONF-109	4.2	Cobalt		11	mg/kg	660	
B-419-CONF-109	4.2	Copper		20	mg/kg	3100	
B-419-CONF-109	4.2	Gross alpha		2.56	pCi/g	3.38	
B-419-CONF-109	4.2	Gross beta		4.5	pCi/g	4.47	Y

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-109	4.2	Hexavalent Chromium		2.2	mg/kg	2.2	Y
B-419-CONF-109	4.2	Lead		14	mg/kg	400	
B-419-CONF-109	4.2	Mercury		0.87	mg/kg	10	
B-419-CONF-109	4.2	Nickel		43	mg/kg	1500	
B-419-CONF-109	4.2	PCB 1254		0.55	mg/kg	0.22	Y
B-419-CONF-109	4.2	Vanadium		38	mg/kg	390	
B-419-CONF-109	4.2	Zinc		44	mg/kg	23000	
B-419-CONF-201	10	Arsenic		3.5	mg/kg	11	
B-419-CONF-201	10	Barium		100	mg/kg	15000	
B-419-CONF-201	10	Chromium		18	mg/kg	48.9	
B-419-CONF-201	10	Cobalt		5.6	mg/kg	660	
B-419-CONF-201	10	Copper		14	mg/kg	3100	
B-419-CONF-201	10	Lead		4.3	mg/kg	400	
B-419-CONF-201	10	Mercury		0.05	mg/kg	10	
B-419-CONF-201	10	Nickel		24	mg/kg	1500	
B-419-CONF-201	10	Selenium		0.94	mg/kg	390	
B-419-CONF-201	10	Tritium		0.278	pCi/g	110	
B-419-CONF-201	10	Vanadium		17	mg/kg	390	
B-419-CONF-201	10	Zinc		25	mg/kg	23000	
B-419-CONF-202	10	Arsenic		3.5	mg/kg	11	
B-419-CONF-202	10	Barium		160	mg/kg	15000	
B-419-CONF-202	10	Chromium		22	mg/kg	48.9	
B-419-CONF-202	10	Cobalt		8	mg/kg	660	
B-419-CONF-202	10	Copper		14	mg/kg	3100	
B-419-CONF-202	10	Lead		5.1	mg/kg	400	
B-419-CONF-202	10	Mercury		0.057	mg/kg	10	
B-419-CONF-202	10	Nickel		31	mg/kg	1500	
B-419-CONF-202	10	Selenium		1.1	mg/kg	390	
B-419-CONF-202	10	Vanadium		24	mg/kg	390	
B-419-CONF-202	10	Zinc		31	mg/kg	23000	
B-419-CONF-203	1.9	Arsenic		3.7	mg/kg	11	
B-419-CONF-203	1.9	Barium		200	mg/kg	15000	
B-419-CONF-203	1.9	Chromium		32	mg/kg	48.9	
B-419-CONF-203	1.9	Cobalt		10	mg/kg	660	
B-419-CONF-203	1.9	Copper		19	mg/kg	3100	
B-419-CONF-203	1.9	Gross alpha		2.11	pCi/g	3.38	
B-419-CONF-203	1.9	Gross beta		3.5	pCi/g	4.47	
B-419-CONF-203	1.9	Lead		6.9	mg/kg	400	
B-419-CONF-203	1.9	Nickel		42	mg/kg	1500	
B-419-CONF-203	1.9	Thallium	<	5.4	mg/kg	5	Y*
B-419-CONF-203	1.9	Vanadium		33	mg/kg	390	
B-419-CONF-203	1.9	Zinc		38	mg/kg	23000	
B-419-CONF-204	1.4	Arsenic		4.3	mg/kg	11	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-204	1.4	Barium		140	mg/kg	15000	
B-419-CONF-204	1.4	Chromium		29	mg/kg	48.9	
B-419-CONF-204	1.4	Cobalt		10	mg/kg	660	
B-419-CONF-204	1.4	Copper		20	mg/kg	3100	
B-419-CONF-204	1.4	Gross beta		3	pCi/g	4.47	
B-419-CONF-204	1.4	Lead		6.4	mg/kg	400	
B-419-CONF-204	1.4	Mercury		0.037	mg/kg	10	
B-419-CONF-204	1.4	Nickel		58	mg/kg	1500	
B-419-CONF-204	1.4	Thallium	<	5.2	mg/kg	5	Y*
B-419-CONF-204	1.4	Vanadium		28	mg/kg	390	
B-419-CONF-204	1.4	Zinc		41	mg/kg	23000	
B-419-CONF-205	1.9	Arsenic		2.9	mg/kg	11	
B-419-CONF-205	1.9	Barium		440	mg/kg	15000	
B-419-CONF-205	1.9	Chromium		27	mg/kg	48.9	
B-419-CONF-205	1.9	Cobalt		9.6	mg/kg	660	
B-419-CONF-205	1.9	Copper		17	mg/kg	3100	
B-419-CONF-205	1.9	Gross beta		2.88	pCi/g	4.47	
B-419-CONF-205	1.9	Lead		6.8	mg/kg	400	
B-419-CONF-205	1.9	Mercury		0.036	mg/kg	10	
B-419-CONF-205	1.9	Nickel		36	mg/kg	1500	
B-419-CONF-205	1.9	Selenium		1.1	mg/kg	390	
B-419-CONF-205	1.9	Vanadium		29	mg/kg	390	
B-419-CONF-205	1.9	Zinc		310	mg/kg	23000	
B-419-CONF-206	1.9	Arsenic		3.2	mg/kg	11	
B-419-CONF-206	1.9	Barium		160	mg/kg	15000	
B-419-CONF-206	1.9	Chromium		25	mg/kg	48.9	
B-419-CONF-206	1.9	Cobalt		8.8	mg/kg	660	
B-419-CONF-206	1.9	Copper		17	mg/kg	3100	
B-419-CONF-206	1.9	Lead		5.5	mg/kg	400	
B-419-CONF-206	1.9	Nickel		33	mg/kg	1500	
B-419-CONF-206	1.9	Selenium		1.2	mg/kg	390	
B-419-CONF-206	1.9	Vanadium		28	mg/kg	390	
B-419-CONF-206	1.9	Zinc		33	mg/kg	23000	
B-419-CONF-207	2.4	Arsenic		3.6	mg/kg	11	
B-419-CONF-207	2.4	Barium		160	mg/kg	15000	
B-419-CONF-207	2.4	Chromium		26	mg/kg	48.9	
B-419-CONF-207	2.4	Cobalt		8	mg/kg	660	
B-419-CONF-207	2.4	Copper		17	mg/kg	3100	
B-419-CONF-207	2.4	Gross beta		2.12	pCi/g	4.47	
B-419-CONF-207	2.4	Lead		7.2	mg/kg	400	
B-419-CONF-207	2.4	Mercury		0.051	mg/kg	10	
B-419-CONF-207	2.4	Nickel		36	mg/kg	1500	
B-419-CONF-207	2.4	Selenium		1.2	mg/kg	390	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-207	2.4	Vanadium		26	mg/kg	390	
B-419-CONF-207	2.4	Zinc		44	mg/kg	23000	
B-419-CONF-208	1.6	Arsenic		3.7	mg/kg	11	
B-419-CONF-208	1.6	Barium		170	mg/kg	15000	
B-419-CONF-208	1.6	Chromium		35	mg/kg	48.9	
B-419-CONF-208	1.6	Cobalt		9.5	mg/kg	660	
B-419-CONF-208	1.6	Copper		17	mg/kg	3100	
B-419-CONF-208	1.6	Lead		7.8	mg/kg	400	
B-419-CONF-208	1.6	Mercury		0.072	mg/kg	10	
B-419-CONF-208	1.6	Nickel		44	mg/kg	1500	
B-419-CONF-208	1.6	Selenium		1.3	mg/kg	390	
B-419-CONF-208	1.6	Vanadium		28	mg/kg	390	
B-419-CONF-208	1.6	Zinc		48	mg/kg	23000	
B-419-CONF-209	1.6	Arsenic		3	mg/kg	11	
B-419-CONF-209	1.6	Barium		180	mg/kg	15000	
B-419-CONF-209	1.6	Chromium		37	mg/kg	48.9	
B-419-CONF-209	1.6	Cobalt		9.8	mg/kg	660	
B-419-CONF-209	1.6	Copper		16	mg/kg	3100	
B-419-CONF-209	1.6	Gross beta		2.02	pCi/g	4.47	
B-419-CONF-209	1.6	Lead		11	mg/kg	400	
B-419-CONF-209	1.6	Nickel		65	mg/kg	1500	
B-419-CONF-209	1.6	Selenium		0.99	mg/kg	390	
B-419-CONF-209	1.6	Vanadium		25	mg/kg	390	
B-419-CONF-209	1.6	Zinc		380	mg/kg	23000	
B-419-CONF-301	12	Arsenic		2.8	mg/kg	11	
B-419-CONF-301	12	Barium		130	mg/kg	15000	
B-419-CONF-301	12	Chromium		24	mg/kg	48.9	
B-419-CONF-301	12	Cobalt		7.3	mg/kg	660	
B-419-CONF-301	12	Copper		15	mg/kg	3100	
B-419-CONF-301	12	Lead		7	mg/kg	400	
B-419-CONF-301	12	Mercury		0.099	mg/kg	10	
B-419-CONF-301	12	Nickel		34	mg/kg	1500	
B-419-CONF-301	12	Selenium		0.58	mg/kg	390	
B-419-CONF-301	12	Thallium		1	mg/kg	5	
B-419-CONF-301	12	Tritium		8.7	pCi/g	110	
B-419-CONF-301	12	Vanadium		20	mg/kg	390	
B-419-CONF-301	12	Zinc		38	mg/kg	23000	
B-419-CONF-302	12	Arsenic		3.8	mg/kg	11	
B-419-CONF-302	12	Barium		110	mg/kg	15000	
B-419-CONF-302	12	Chromium		28	mg/kg	48.9	
B-419-CONF-302	12	Cobalt		6.9	mg/kg	660	
B-419-CONF-302	12	Copper		15	mg/kg	3100	
B-419-CONF-302	12	Gross beta		2.2	pCi/g	4.47	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-302	12	Lead		5.1	mg/kg	400	
B-419-CONF-302	12	Mercury		0.14	mg/kg	10	
B-419-CONF-302	12	Nickel		32	mg/kg	1500	
B-419-CONF-302	12	Vanadium		21	mg/kg	390	
B-419-CONF-302	12	Zinc		36	mg/kg	23000	
B-419-CONF-303	5.2	Arsenic		1.9	mg/kg	11	
B-419-CONF-303	5.2	Barium		79	mg/kg	15000	
B-419-CONF-303	5.2	Chromium		21	mg/kg	48.9	
B-419-CONF-303	5.2	Cobalt		5.8	mg/kg	660	
B-419-CONF-303	5.2	Copper		11	mg/kg	3100	
B-419-CONF-303	5.2	Gross alpha		2.17	pCi/g	3.38	
B-419-CONF-303	5.2	Lead		3.9	mg/kg	400	
B-419-CONF-303	5.2	Mercury		0.07	mg/kg	10	
B-419-CONF-303	5.2	Nickel		33	mg/kg	1500	
B-419-CONF-303	5.2	Selenium		1.4	mg/kg	390	
B-419-CONF-303	5.2	Vanadium		15	mg/kg	390	
B-419-CONF-303	5.2	Zinc		27	mg/kg	23000	
B-419-CONF-304	5.2	Arsenic		3	mg/kg	11	
B-419-CONF-304	5.2	Barium		110	mg/kg	15000	
B-419-CONF-304	5.2	Chromium		31	mg/kg	48.9	
B-419-CONF-304	5.2	Cobalt		8.5	mg/kg	660	
B-419-CONF-304	5.2	Copper		14	mg/kg	3100	
B-419-CONF-304	5.2	Lead		5.1	mg/kg	400	
B-419-CONF-304	5.2	Mercury		0.094	mg/kg	10	
B-419-CONF-304	5.2	Nickel		40	mg/kg	1500	
B-419-CONF-304	5.2	Selenium		2.1	mg/kg	390	
B-419-CONF-304	5.2	Thallium		1.2	mg/kg	5	
B-419-CONF-304	5.2	Vanadium		21	mg/kg	390	
B-419-CONF-304	5.2	Zinc		36	mg/kg	23000	
B-419-CONF-305	5.2	Arsenic		2.8	mg/kg	11	
B-419-CONF-305	5.2	Barium		96	mg/kg	15000	
B-419-CONF-305	5.2	Chromium		25	mg/kg	48.9	
B-419-CONF-305	5.2	Cobalt		6.4	mg/kg	660	
B-419-CONF-305	5.2	Copper		12	mg/kg	3100	
B-419-CONF-305	5.2	Gross beta		2.37	pCi/g	4.47	
B-419-CONF-305	5.2	Lead		5.2	mg/kg	400	
B-419-CONF-305	5.2	Mercury		0.08	mg/kg	10	
B-419-CONF-305	5.2	Nickel		33	mg/kg	1500	
B-419-CONF-305	5.2	Selenium		2.1	mg/kg	390	
B-419-CONF-305	5.2	Vanadium		17	mg/kg	390	
B-419-CONF-305	5.2	Zinc		29	mg/kg	23000	
B-419-CONF-306	5.2	Arsenic		3.4	mg/kg	11	
B-419-CONF-306	5.2	Barium		120	mg/kg	15000	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-306	5.2	Chromium		33	mg/kg	48.9	
B-419-CONF-306	5.2	Cobalt		8.9	mg/kg	660	
B-419-CONF-306	5.2	Copper		16	mg/kg	3100	
B-419-CONF-306	5.2	Lead		10	mg/kg	400	
B-419-CONF-306	5.2	Mercury		0.12	mg/kg	10	
B-419-CONF-306	5.2	Nickel		41	mg/kg	1500	
B-419-CONF-306	5.2	PCB 1254		0.39	mg/kg	0.22	Y
B-419-CONF-306	5.2	Selenium		1.3	mg/kg	390	
B-419-CONF-306	5.2	Vanadium		23	mg/kg	390	
B-419-CONF-306	5.2	Zinc		40	mg/kg	23000	
B-419-CONF-307	5.2	Arsenic		3.3	mg/kg	11	
B-419-CONF-307	5.2	Arsenic		3.4	mg/kg	11	
B-419-CONF-307	5.2	Barium		130	mg/kg	15000	
B-419-CONF-307	5.2	Barium		150	mg/kg	15000	
B-419-CONF-307	5.2	Beryllium		1.1	mg/kg	160	
B-419-CONF-307	5.2	Chromium		28	mg/kg	48.9	
B-419-CONF-307	5.2	Chromium		33	mg/kg	48.9	
B-419-CONF-307	5.2	Cobalt		8.1	mg/kg	660	
B-419-CONF-307	5.2	Cobalt		9.2	mg/kg	660	
B-419-CONF-307	5.2	Copper		17	mg/kg	3100	
B-419-CONF-307	5.2	Copper		19	mg/kg	3100	
B-419-CONF-307	5.2	Gross alpha		2.37	pCi/g	3.38	
B-419-CONF-307	5.2	Gross beta		2.09	pCi/g	4.47	
B-419-CONF-307	5.2	Lead		15	mg/kg	400	
B-419-CONF-307	5.2	Lead		16	mg/kg	400	
B-419-CONF-307	5.2	Mercury		0.21	mg/kg	10	
B-419-CONF-307	5.2	Mercury		0.69	mg/kg	10	
B-419-CONF-307	5.2	Nickel		39	mg/kg	1500	
B-419-CONF-307	5.2	Nickel		50	mg/kg	1500	
B-419-CONF-307	5.2	PCB 1248	<	0.53	mg/kg	0.22	Y*
B-419-CONF-307	5.2	PCB 1248	<	1.8	mg/kg	0.22	Y*
B-419-CONF-307	5.2	PCB 1254		1.7	mg/kg	0.22	Y
B-419-CONF-307	5.2	PCB 1254		4	mg/kg	0.22	Y
B-419-CONF-307	5.2	Selenium		1.9	mg/kg	390	
B-419-CONF-307	5.2	Selenium		2.3	mg/kg	390	
B-419-CONF-307	5.2	Vanadium		24	mg/kg	390	
B-419-CONF-307	5.2	Vanadium		26	mg/kg	390	
B-419-CONF-307	5.2	Zinc		46	mg/kg	23000	
B-419-CONF-307	5.2	Zinc		46	mg/kg	23000	
B-419-CONF-308	5.2	Arsenic		2.5	mg/kg	11	
B-419-CONF-308	5.2	Barium		130	mg/kg	15000	
B-419-CONF-308	5.2	Chromium		27	mg/kg	48.9	
B-419-CONF-308	5.2	Cobalt		8.9	mg/kg	660	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-308	5.2	Copper		14	mg/kg	3100	
B-419-CONF-308	5.2	Lead		7.8	mg/kg	400	
B-419-CONF-308	5.2	Mercury		0.083	mg/kg	10	
B-419-CONF-308	5.2	Nickel		41	mg/kg	1500	
B-419-CONF-308	5.2	Selenium		1.9	mg/kg	390	
B-419-CONF-308	5.2	Vanadium		23	mg/kg	390	
B-419-CONF-308	5.2	Zinc		34	mg/kg	23000	
B-419-CONF-309	5.2	Arsenic		2.2	mg/kg	11	
B-419-CONF-309	5.2	Barium		89	mg/kg	15000	
B-419-CONF-309	5.2	Chromium		26	mg/kg	48.9	
B-419-CONF-309	5.2	Cobalt		7.2	mg/kg	660	
B-419-CONF-309	5.2	Copper		15	mg/kg	3100	
B-419-CONF-309	5.2	Gross beta		2.52	pCi/g	4.47	
B-419-CONF-309	5.2	Lead		4.7	mg/kg	400	
B-419-CONF-309	5.2	Mercury		0.14	mg/kg	10	
B-419-CONF-309	5.2	Nickel		34	mg/kg	1500	
B-419-CONF-309	5.2	Selenium		1.5	mg/kg	390	
B-419-CONF-309	5.2	Vanadium		19	mg/kg	390	
B-419-CONF-309	5.2	Zinc		30	mg/kg	23000	
B-419-CONF-401	3	Arsenic		3.1	mg/kg	11	
B-419-CONF-401	3	Barium		180	mg/kg	15000	
B-419-CONF-401	3	Chromium		31	mg/kg	48.9	
B-419-CONF-401	3	Cobalt		9.3	mg/kg	660	
B-419-CONF-401	3	Copper		26	mg/kg	3100	
B-419-CONF-401	3	Lead		15	mg/kg	400	
B-419-CONF-401	3	Mercury		0.63	mg/kg	10	
B-419-CONF-401	3	Nickel		41	mg/kg	1500	
B-419-CONF-401	3	Thallium	<	5.1	mg/kg	5	Y*
B-419-CONF-401	3	Vanadium		26	mg/kg	390	
B-419-CONF-401	3	Zinc		57	mg/kg	23000	
B-419-CONF-402	3	Arsenic		3.4	mg/kg	11	
B-419-CONF-402	3	Barium		120	mg/kg	15000	
B-419-CONF-402	3	Chromium		29	mg/kg	48.9	
B-419-CONF-402	3	Cobalt		8.9	mg/kg	660	
B-419-CONF-402	3	Copper		25	mg/kg	3100	
B-419-CONF-402	3	Gross alpha		5.2	pCi/g	3.38	Y
B-419-CONF-402	3	Gross beta		7.7	pCi/g	4.47	Y
B-419-CONF-402	3	Lead		17	mg/kg	400	
B-419-CONF-402	3	Mercury		0.98	mg/kg	10	
B-419-CONF-402	3	Nickel		42	mg/kg	1500	
B-419-CONF-402	3	Selenium		1.2	mg/kg	390	
B-419-CONF-402	3	Vanadium		23	mg/kg	390	
B-419-CONF-402	3	Zinc		160	mg/kg	23000	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-403	3	Arsenic		3.8	mg/kg	11	
B-419-CONF-403	3	Barium		140	mg/kg	15000	
B-419-CONF-403	3	Chromium		28	mg/kg	48.9	
B-419-CONF-403	3	Cobalt		9.5	mg/kg	660	
B-419-CONF-403	3	Copper		18	mg/kg	3100	
B-419-CONF-403	3	Gross alpha		2.18	pCi/g	3.38	
B-419-CONF-403	3	Gross beta		2.59	pCi/g	4.47	
B-419-CONF-403	3	Lead		6.4	mg/kg	400	
B-419-CONF-403	3	Mercury		0.1	mg/kg	10	
B-419-CONF-403	3	Nickel		39	mg/kg	1500	
B-419-CONF-403	3	Selenium		1.2	mg/kg	390	
B-419-CONF-403	3	Vanadium		26	mg/kg	390	
B-419-CONF-403	3	Zinc		36	mg/kg	23000	
B-419-CONF-404	3	Arsenic		4.3	mg/kg	11	
B-419-CONF-404	3	Barium		160	mg/kg	15000	
B-419-CONF-404	3	Chromium		29	mg/kg	48.9	
B-419-CONF-404	3	Cobalt		11	mg/kg	660	
B-419-CONF-404	3	Copper		21	mg/kg	3100	
B-419-CONF-404	3	Lead		8.2	mg/kg	400	
B-419-CONF-404	3	Mercury		0.12	mg/kg	10	
B-419-CONF-404	3	Nickel		49	mg/kg	1500	
B-419-CONF-404	3	Thallium	<	5.2	mg/kg	5	Y*
B-419-CONF-404	3	Vanadium		28	mg/kg	390	
B-419-CONF-404	3	Zinc		40	mg/kg	23000	
B-419-CONF-405	1.2	Arsenic		3.7	mg/kg	11	
B-419-CONF-405	1.2	Barium		170	mg/kg	15000	
B-419-CONF-405	1.2	Chromium		26	mg/kg	48.9	
B-419-CONF-405	1.2	Cobalt		8.5	mg/kg	660	
B-419-CONF-405	1.2	Copper		16	mg/kg	3100	
B-419-CONF-405	1.2	Gross alpha		2.11	pCi/g	3.38	
B-419-CONF-405	1.2	Gross beta		2.69	pCi/g	4.47	
B-419-CONF-405	1.2	Lead		12	mg/kg	400	
B-419-CONF-405	1.2	Nickel		33	mg/kg	1500	
B-419-CONF-405	1.2	Selenium		1.2	mg/kg	390	
B-419-CONF-405	1.2	Vanadium		26	mg/kg	390	
B-419-CONF-405	1.2	Zinc		45	mg/kg	23000	
B-419-CONF-406	1.3	Arsenic		3.5	mg/kg	11	
B-419-CONF-406	1.3	Barium		170	mg/kg	15000	
B-419-CONF-406	1.3	Chromium		32	mg/kg	48.9	
B-419-CONF-406	1.3	Cobalt		9.2	mg/kg	660	
B-419-CONF-406	1.3	Copper		18	mg/kg	3100	
B-419-CONF-406	1.3	Gross beta		2.65	pCi/g	4.47	
B-419-CONF-406	1.3	Lead		32	mg/kg	400	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-406	1.3	Mercury		0.27	mg/kg	10	
B-419-CONF-406	1.3	Nickel		40	mg/kg	1500	
B-419-CONF-406	1.3	Selenium		1.1	mg/kg	390	
B-419-CONF-406	1.3	Vanadium		26	mg/kg	390	
B-419-CONF-406	1.3	Zinc		110	mg/kg	23000	
B-419-CONF-407	1.6	Arsenic		4.3	mg/kg	11	
B-419-CONF-407	1.6	Barium		160	mg/kg	15000	
B-419-CONF-407	1.6	Chromium		26	mg/kg	48.9	
B-419-CONF-407	1.6	Cobalt		9.7	mg/kg	660	
B-419-CONF-407	1.6	Copper		17	mg/kg	3100	
B-419-CONF-407	1.6	Gross beta		2.24	pCi/g	4.47	
B-419-CONF-407	1.6	Lead		9.2	mg/kg	400	
B-419-CONF-407	1.6	Mercury		0.082	mg/kg	10	
B-419-CONF-407	1.6	Nickel		34	mg/kg	1500	
B-419-CONF-407	1.6	Selenium		0.91	mg/kg	390	
B-419-CONF-407	1.6	Vanadium		27	mg/kg	390	
B-419-CONF-407	1.6	Zinc		49	mg/kg	23000	
B-419-CONF-408	1.4	Arsenic		3.1	mg/kg	11	
B-419-CONF-408	1.4	Barium		160	mg/kg	15000	
B-419-CONF-408	1.4	Chromium		25	mg/kg	48.9	
B-419-CONF-408	1.4	Cobalt		8.4	mg/kg	660	
B-419-CONF-408	1.4	Copper		17	mg/kg	3100	
B-419-CONF-408	1.4	Gross beta		2.92	pCi/g	4.47	
B-419-CONF-408	1.4	Lead		250	mg/kg	400	
B-419-CONF-408	1.4	Mercury		0.075	mg/kg	10	
B-419-CONF-408	1.4	Nickel		30	mg/kg	1500	
B-419-CONF-408	1.4	Selenium		1.1	mg/kg	390	
B-419-CONF-408	1.4	Vanadium		24	mg/kg	390	
B-419-CONF-408	1.4	Zinc		67	mg/kg	23000	
B-419-CONF-409	1	Arsenic		3.4	mg/kg	11	
B-419-CONF-409	1	Barium		150	mg/kg	15000	
B-419-CONF-409	1	Chromium		26	mg/kg	48.9	
B-419-CONF-409	1	Cobalt		8.2	mg/kg	660	
B-419-CONF-409	1	Copper		15	mg/kg	3100	
B-419-CONF-409	1	Lead		9.2	mg/kg	400	
B-419-CONF-409	1	Mercury		0.08	mg/kg	10	
B-419-CONF-409	1	Nickel		33	mg/kg	1500	
B-419-CONF-409	1	Selenium		1.2	mg/kg	390	
B-419-CONF-409	1	Vanadium		26	mg/kg	390	
B-419-CONF-409	1	Zinc		41	mg/kg	23000	
B-419-CONF-410	2.5	Arsenic		4	mg/kg	11	
B-419-CONF-410	2.5	Barium		160	mg/kg	15000	
B-419-CONF-410	2.5	Chromium		33	mg/kg	48.9	

Sample Location	Depth (Feet)	Analyte	_	Result	Unit	Bldg 419 Clean Closure Standards	Above Screening Levels (Y=yes)
B-419-CONF-410	2.5	Cobalt		9.6	mg/kg	660	
B-419-CONF-410	2.5	Copper		29	mg/kg	3100	
B-419-CONF-410	2.5	Lead		7.9	mg/kg	400	
B-419-CONF-410	2.5	Mercury		0.12	mg/kg	10	
B-419-CONF-410	2.5	Nickel		38	mg/kg	1500	
B-419-CONF-410	2.5	Thallium	<	5.4	mg/kg	5	Y*
B-419-CONF-410	2.5	Vanadium		31	mg/kg	390	
B-419-CONF-410	2.5	Zinc		43	mg/kg	23000	
B-419-R167-STAIN	1.7	Acetone		0.042	mg/kg	61000	
B-419-R167-STAIN	1.7	Arsenic		3.7	mg/kg	11	
B-419-R167-STAIN	1.7	Barium		110	mg/kg	15000	
B-419-R167-STAIN	1.7	Chromium		27	mg/kg	48.9	
B-419-R167-STAIN	1.7	Cobalt		11	mg/kg	660	
B-419-R167-STAIN	1.7	Copper		17	mg/kg	3100	
B-419-R167-STAIN	1.7	Gross alpha		2.45	pCi/g	3.38	
B-419-R167-STAIN	1.7	Gross beta		3.66	pCi/g	4.47	
B-419-R167-STAIN	1.7	Lead		5.4	mg/kg	400	
B-419-R167-STAIN	1.7	Mercury		0.038	mg/kg	10	
B-419-R167-STAIN	1.7	Nickel		29	mg/kg	1500	
B-419-R167-STAIN	1.7	Selenium		0.61	mg/kg	390	
B-419-R167-STAIN	1.7	Vanadium		29	mg/kg	390	
B-419-R167-STAIN	1.7	Zinc		31	mg/kg	23000	
* - The detection limit for the sample exceeds the screening level.							

Appendix R

Risk Assessment

Health Risk Assessment for Building 419 RCRA Closure

Summary

Lawrence Livermore National Laboratory (LLNL) is a U.S. Department of Energy research and development institution for science and technology applied to national security. The building that is the subject of this document, Building 419, previously was the location of active LLNL waste treatment facilities. The site is being closed pursuant to the requirements of the Resource Conservation Recovery Act and overseen by the Department of Toxic Substances Control (DTSC). The DTSC-approved documentation (LLNL 2012) state closure performance standards for Building 419 and surrounding soils. Soil removal activities have taken place and post-excavation soil sampling and analysis have been conducted. The analysis showed that, with the exception of Aroclor 1254, all constituents of concern met the screening level for closure.

Aroclor 1254 was detected at two of the nine locations sampled near the tank vault area at Building 419. The highest detected value was 4 mg/kg and the mean, which is impacted by the high number of non-detections, was determined to be constrained between 0.488 and 0.515 mg/kg.

This human health risk assessment evaluates the carcinogenic risk and non-carcinogenic hazard associated with the Aroclor 1254 detected in the tank vault area. The receptors evaluated include a hypothetical industrial/commercial receptor and a hypothetical, and less likely, residential receptor. Based on the upper mean estimate soil concentration of 0.515 mg/kg, the industrial/commercial worker was estimated to have a theoretical calculated carcinogenic risk of 8.8×10^{-7} and a chronic hazard index of 2.5×10^{-2}. Similarly, the incremental cancer risk for the residential receptor was estimated at 2.1×10^{-6}, and the estimated chronic hazard index for the residential receptor was 4.9×10^{-1}. These risk and hazard values are all below levels associated with health concerns, and support the conclusion that further cleanup of the area is not necessary. These values scale linearly with concentration, so the estimated risk and hazard represented by the maximum detection of 4 mg/kg is roughly 8 times greater than these estimates. Because LLNL is a U.S. Department of Energy owned facility with a continuing mission and a CERCLA Superfund site, it is unlikely that the site would be used as a residential area; moreover, the area contaminated at this level is quite small and the default assumptions of the calculation substantially overestimate the level of risk associated with the contamination.

Introduction

Lawrence Livermore National Laboratory (LLNL) is a U.S. Department of Energy research and development institution for science and technology applied to national security. Waste storage and treatment activities for LLNL were conducted in Building 419 and associated buildings and outside areas from the 1950s (Dreicer, 1985) until the 1980s. A tank vault area within the footprint of the former Building 419 is the small area that is the subject of this human health risk assessment. The site is being closed pursuant to the requirements of the Resource Conservation Recovery Act (RCRA).

Currently, all the structures and equipment associated with Building 419 have been removed, and the area has been covered with asphalt. The site of the former Building 419 is pictured in Figure 1.

Figure 1. Area where Building 419 was located, view looking north. (Photo taken February 2013).

Constituents of Potential Concern

The DTSC-approved documentation (LLNL, 2012) includes closure performance standards for certain organic compounds and metals. If all measured values of these constituents in soil were less than these levels, it was agreed that the site would meet the requirements for closure.

LLNL has completed the excavation and removal of the contaminated soils for Building 419 closure and has conducted post excavation sampling and analysis. The only excavation site that did not meet the performance standards for closure was near a former tank vault, for which two of nine confirmation samples were above the screening level for Aroclor 1254. Consequently, Aroclor 1254 is the only Constituent of Potential Concern for this assessment.

The highest detected value of Aroclor 1254 was 4 mg/kg and the other value was 0.390 mg/kg; the mean of all nine samples, the calculation of which is impacted by the seven non-detections, was determined to be constrained between 0.488 and 0.515 mg/kg.

Receptors and Exposure Pathways

The footprint of Building 419 is small and encompasses about 7,700 square feet. The area associated with the tank vault excavation was roughly 360 square feet in extent and 12 feet deep. The area associated with the RCRA closure is somewhat larger, at about 15,000 square feet. It is in a portion of the LLNL Livermore site where many plant maintenance activities and crafts shops, such as carpentry, welding, and heavy equipment maintenance, are currently located. The receptors of concern are industrial/commercial workers, i.e., those who have a work area or office near the area formerly occupied by Building 419. In addition, a hypothetical future residential receptor was evaluated based on the possibility that a change in property ownership could make the site available in the future for residential occupancy.

For the industrial/commercial worker, the hypothetical exposure pathways are inhalation of particles resuspended from the soil, dermal exposure, and incidental ingestion of contaminated soil in the area. These exposures are hypothetical because the area is currently covered with asphalt and there is no actual exposure pathway. Drinking water was not evaluated as a pathway to the worker because ground water is not a source of drinking water for LLNL Livermore site employees. Drinking water is supplied to LLNL by the San Francisco Hetch Hetchy Aqueduct System and the Alameda County Flood and Water Conservation District, Zone 7 (Zone 7). Furthermore, the tiered analysis conducted as part of the RCRA closure process shows that soil volumes with contaminants that may potentially impact ground water were removed and therefore should not pose any risk to ground water in the future (LLNL, 2012). The parameters used to estimate worker exposure are listed in Table 1; references are provided for the specific values.

For the residential exposure scenario, hypothetical exposures occur via inhalation of particulate contaminants present in soil, by incidental ingestion of soil, and by dermal contact and absorption of contaminants from the soil matrix. As stated previously, exposure via ingestion of groundwater was not included in this analysis. If the area were to be used as a residence, it is likely that drinking water or water for domestic use would be supplied by the City and County of San Francisco or by Zone 7. Both of these water suppliers offer high quality water without the need for installation and maintenance of a costly water supply well. Similarly, ingestion of homegrown fruits and vegetables was not evaluated as a source of exposure given that (1) home gardens would likely be supplied with clean water from an external source, and (2) it is unlikely that enough produce could be grown on a residential lot to contribute significantly to a resident's diet. Exposure factors used in the residential and industrial/commercial scenarios are given in Table 1.

The inhalation unit risk factors, cancer slope factors, reference doses, and other chemical specific information for the materials evaluated are listed in Table 2. The hierarchy for the choice of toxicity values is as follows: first tier, OEHHA guidance (OEHHA, 2012); second tier, U.S. EPA, Region 9, Regional Screening Level Table (2012). No non-carcinogenic hazard value for inhalation was found in either of these sources, nor was such a value found in Integrated Risk Information System (IRIS) (US EPA 2013) or Health Effects Assessment Summary Tables (HEAST) (ORNL, 2013); consequently, non-carcinogenic hazard was not calculated for this exposure pathway.

The equations used to evaluate carcinogenic risk and non-carcinogenic hazard are presented in Table 3 (US EPA, 2009; US EPA, 1989; DTSC, 1994).

Table 1. Exposure parameters

Exposure parameter	Value	Reference
Annual exposure frequency (EF)	Industrial/commercial worker 250 days/year Resident 350 days/year	HERO (2011) HERO (2011)
Exposure duration (ED)	Industrial/commercial worker 25 years Resident Adult, 24 years Child, 6 years	HERO (2011) HERO (2011)
Averaging time (AT) Carcinogens	Industrial/commercial worker 25,550 days Resident, 25,550 days	HERO (2011); corresponds to a70-year lifetime
Averaging time (AT) Noncarcinogens	Industrial/commercial worker 9,125 days Resident, adult 8760 Resident, child 2190	HERO (2011); corresponds to a 25-year career HERO (2011); corresponds to a 24-year residential duration HERO (2011); corresponds to a 6-year residential duration
Body weight (BW)	Adult 70 kg Child 15 kg	HERO (2011)
Inhalation rate (InhR)	Adult, 20 m^3/d Child, 10 m^3/d	HERO (2011)
Soil ingestion rate (IngR) –	Adult 100 mg/d Child 200 mg/d	HERO (2011)
Soil adherence factor (AdF) –	Industrial/commercial worker 0.2 mg/cm^2 Resident adult 0.07 mg/cm^2 Resident child 0.2 mg/cm^2	HERO (2011)
Skin surface area for soil contact (SSA)-	Adult 5700 cm^2 Child 2900 cm^2	HERO (2011)
Particulate Emission Factor (PEF)	1.316×10^9	HERO (2011)

Table 2. Inhalation unit reference factor, ingestion slope factor, reference doses, and skin absorption fractions for Aroclor 1254.*

Constituent of Potential Concern	Inhalation Unit Risk (IUR, Risk/mg/m^3)*	Slope Factor Oral (SF_o, Risk/mg/kg•d)*	Reference Concentration (RFC_i, mg/m^3)	Reference Dose Oral (RfD_o, mg/kg•d) †	Skin absorption fraction†
Arachlor 1254 (PCB)	5.7 x 10^{-7}	2.0E+0	None	2.0 x 10^{-5}	0.14

*Factors obtained from OEHHA Guidance (OEHHA, 2012).
†Factors obtained from US EPA, Region 9, Regional Screening Levels (US EPA, 2012).

Table 3. Equations used to calculate carcinogenic risk and non-carcinogenic hazard. (Variables are described in Table 1.)

Risk from inhalation exposure	$IUR \times \frac{C_s}{PEF} \times \frac{EF \times ED}{AT}$
Risk from ingestion exposure	$SF_o \times C_s \times \frac{IngR \times EF \times ED \times 10^{-6} mg/kg}{BW \times AT}$
Risk from dermal exposure	$SF_o \times C_s \times \frac{AbF \times AdF \times SSA \times EF \times ED \times 10^{-6} mg/kg}{BW \times AT}$
Hazard from inhalation exposure*	$\frac{1}{RfC_i} \times \frac{C_s}{PEF} \times \frac{EF \times ED}{AT}$
Hazard from ingestion exposure	$\frac{1}{RfD_o} \times C_s \times \frac{IngR \times EF \times ED \times 10^{-6} mg/kg}{BW \times AT}$
Hazard from dermal exposure	$\frac{1}{RfD_o} \times C_s \times \frac{AbF \times AdF \times SSA \times EF \times ED \times 10^{-6} mg/kg}{BW \times AT}$

*Equation not implemented because no chronic reference concentration has been approved for Aroclor 1254.

The exposure parameters in Table 1 were used with cancer slope factors and non-carcinogenic reference doses in OEHHA-approved equations (see Table 3) to estimate the risk and non-carcinogenic hazard to a hypothetical industrial/commercial worker and to a hypothetical resident. Estimated cancer risk and non-cancer hazard indices were summed across exposure routes; hazard indices were summed without regard to target organ or system. An example calculation for cancer risk from inhalation for the commercial/industrial worker is presented below. All calculations are presented at the end of this appendix.

Example carcinogenic risk calculation for inhalation for industrial/commercial worker:

$$Risk = IUR \times \frac{C_s}{PEF} \times \frac{EF \times ED}{AT}$$

$$Risk = 0.571 \frac{Risk}{mg/m^3} \times \frac{0.515 mg/kg}{1.316 \times 10^9} \times \frac{250 d/y \times 8 h/d \times 25 y}{613200 h}$$

$$Risk = 1.8 \times 10^{-11}$$

The resulting risks and hazards for the upper mean estimated soil concentration of 0.515 mg/kg are summarized in Table 4. The results for the maximum measured soil concentration of 4.0 mg/kg are summarized in Table 5.

Table 4. Summary of carcinogenic risks and hazards for Aroclor 1254 at 0.515 mg/kg concentration in soil.

Assessment end point	Pathway	Hypothetical Industrial/ Commercial Worker	Percent contribution of highest contributing pathway	Hypothetical Resident	Percent contribution of highest contributing pathway
Carcinogenic risk	Inhalation	1.8×10^{-11}	69% ingestion	9.2×10^{-11}	76% ingestion
	Ingestion	6.0×10^{-7}		1.6×10^{-6}	
	Dermal	2.8×10^{-7}		5.2×10^{-7}	
	Total	**8.8×10^{-7}**		**2.1×10^{-6}**	
Chronic hazard	Inhalation		68% ingestion		73% ingestion
	Ingestion	1.7×10^{-2}		3.6×10^{-1}	
	Dermal	7.8×10^{-3}		1.3×10^{-1}	
	Total	**2.5×10^{-2}**		**4.9×10^{-1}**	

Note: Numbers are rounded.

Table 5. Summary of carcinogenic risks and hazards for Aroclor 1254 at 4.0 mg/kg concentration in soil.

Assessment end point	Pathway	Hypothetical Industrial/ Commercial Worker	Percent contribution of highest contributing pathway	Hypothetical Resident	Percent contribution of highest contributing pathway
Carcinogenic risk	Inhalation	1.4×10^{-10}	68% ingestion	7.1×10^{-10}	76% ingestion
	Ingestion	4.7×10^{-6}		1.3×10^{-5}	
	Dermal	2.2×10^{-6}		4.0×10^{-6}	
	Total	**6.9×10^{-6}**		**1.7×10^{-5}**	
Chronic hazard	Inhalation		68% ingestion		74% ingestion
	Ingestion	1.3×10^{-1}		2.8	
	Dermal	6.0×10^{-2}		1.0	
	Total	**1.9×10^{-1}**		**3.8**	

Note: Numbers are rounded.

Uncertainties and Conservatisms

Quantification of exposure involves estimating the magnitude, frequency, and duration of exposure for the receptors for exposure pathways of concern. This risk assessment has implemented high-end estimates for each of these three factors.

First there are conservatisms as to the magnitude of the concentrations of the constituents in soils. The soil concentrations were represented by the highest detection of Aroclor 1254 and the highest end of the estimated range of the mean of the nine detections. The reason the mean is estimated is because seven of the nine samples collected in the area were non-detections for Aroclor 1254. Keeping in mind that the area has been surfaced with asphalt and there is not currently a completed pathway for exposure, all human health consequences estimated here are hypothetical, and would only have the potential to occur in the event that the asphalt were to be removed.

Second, there are conservatisms as to the level of exposure. With respect to incidental soil ingestion, the default rates recommended in the HERO (2011) guidance are consistent with the general population upper percentile rate stated in the US EPA Exposure Factors Handbook (US EPA 2011). These rates are twice the value of the general population central tendency, i.e, the central tendency adult ingestion rate is 50 mg/d and the central tendency child ingestion rate is 10 mg/kg; i.e., a conservative built in factor of two in the ingestion rate. Similarly, the default soil adherence factors found in the HERO (2011) guidance are also consistent with the general population upper percentile rate stated in the US EPA Risk Assessment Guidance, Part E (US EPA 2004). However, the central tendency dermal exposure factor for residential adults is one-seventh of the of the upper percentile (0.01 compared to 0.07 mg/cm^2); the central tendency dermal exposure factor for children is one-fifth of the central tendency value (0.04 compared to 0.2 mg/cm^2); and the central tendency dermal exposure factor for industrial workers is one-tenth of the upper percentile (0.02 compared to 0.2 mg/cm^2). In addition, the dermal calculations assume that child residents are exposed 24 hours a day; this is quite conservative in that the US EPA Exposure Factors Handbook (US EPA 2011) states the maximum activity level for playing on dirt is 120 minutes per day and the mean of the most active age groups of children is 63 minutes per day. Additional conservatism in exposure level is that the tank vault excavation was nominally 360 square feet at the surface; this is considerably less than the 0.5 acre residential lot size that is used in default residential soil exposure calculations. Any actual exposure would include additional surrounding soil, and thus the mean exposure concentration would be considerably less.

Third, the length of duration of exposure, either for a resident or for a worker, is conservative. The assumption that individuals reside in the same place for 30 years is more than twice the mean current residence time of 13 years estimated by the US Census Bureau (quoted in US EPA 2011). Analogously, the default assumption that workers are employed by the same employer for 25 years is conservative compared to the working tenure of 4 years estimated by Gephart et al. (1994).

In addition, the residential exposure scenario calculations are based on the assumption that the area near the former Building 419 would be occupied and used continuously as a residence over a 30-year period. This scenario would occur only if the DOE relinquished ownership of the Livermore site, and an individual subsequently chose to build and occupy a home in this

specific location. Given the industrial character of the site, this does not seem to represent a particularly credible scenario. Furthermore, considering the level of investment by DOE in infrastructure at LLNL, the expectation of continued operations at the Livermore site, and DOE's commitment to and responsibility for protection of public health, it appears that the future residential occupancy of this area is unlikely. Nonetheless, if residential occupancy of the site were to occur in the future, this evaluation indicates that significant adverse health effects are not a likely outcome.

Finally, another consequence of the effect of using many conservative risk factors is a concept described as "compounding conservatism." Studies of the compounding of conservatism in probabilistic risk assessments show that setting as few as two factors at high end levels (*e.g.*, near the 90th -percentile), while setting the remaining variables at less conservative, or typical values results in a product of all input variables that approximate a maximum exposure value (*e.g.*, 99th -percentile value) (Cullen 1994). This risk assessment uses greater than or near 90th-percentile estimates for contaminant concentrations, inhalation rates, ingestion rates, and skin surface exposure, and uses these for estimating the risk associated with two highly conservative estimates of soil concentration. As a result this assessment provides very conservative estimates of health effects that are, nonetheless, within the level of acceptable risk.

Summary of Risks and Hazards

The calculations in this risk assessment are based on conservative assumptions for nearly every parameter, which yields a very conservative upper bound estimate of potential health effects. The calculations demonstrate that using the upper mean estimate concentration of 0.515 mg/kg of Aroclor 1254, the carcinogenic health risk is within the acceptable range of 1 in 10,000 to 1 in 1,000,000: the estimated carcinogenic risk is two in one million, and the chronic hazard index is less than 1. These values are below levels of health concern, and support the conclusion that clean closure of the area for RCRA is appropriate.

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United States Environmental Protection Agency (US EPA), *Regional Screening Levels (Formerly PRGs) Web Site, Screening Levels for Chemical Contaminants, RSL Tables (Last updated November 2012)*, United States Environmental Protection Agency, Pacific Southwest, Region 9, http://www.epa.gov/region9/superfund/prg/index.html (accessed February 2013).

United States Environmental Protection Agency (US EPA), *Integrated Risk Information System, Aroclor 1254 (CASRN 11097-69-1)*, United States Environmental Protection Agency, http://www.epa.gov/iris/subst/0389.htm (accessed February 2013).

Appendix S

Grading Plan

Environmental Functional Area

Environmental Support and Programmatic Outreach

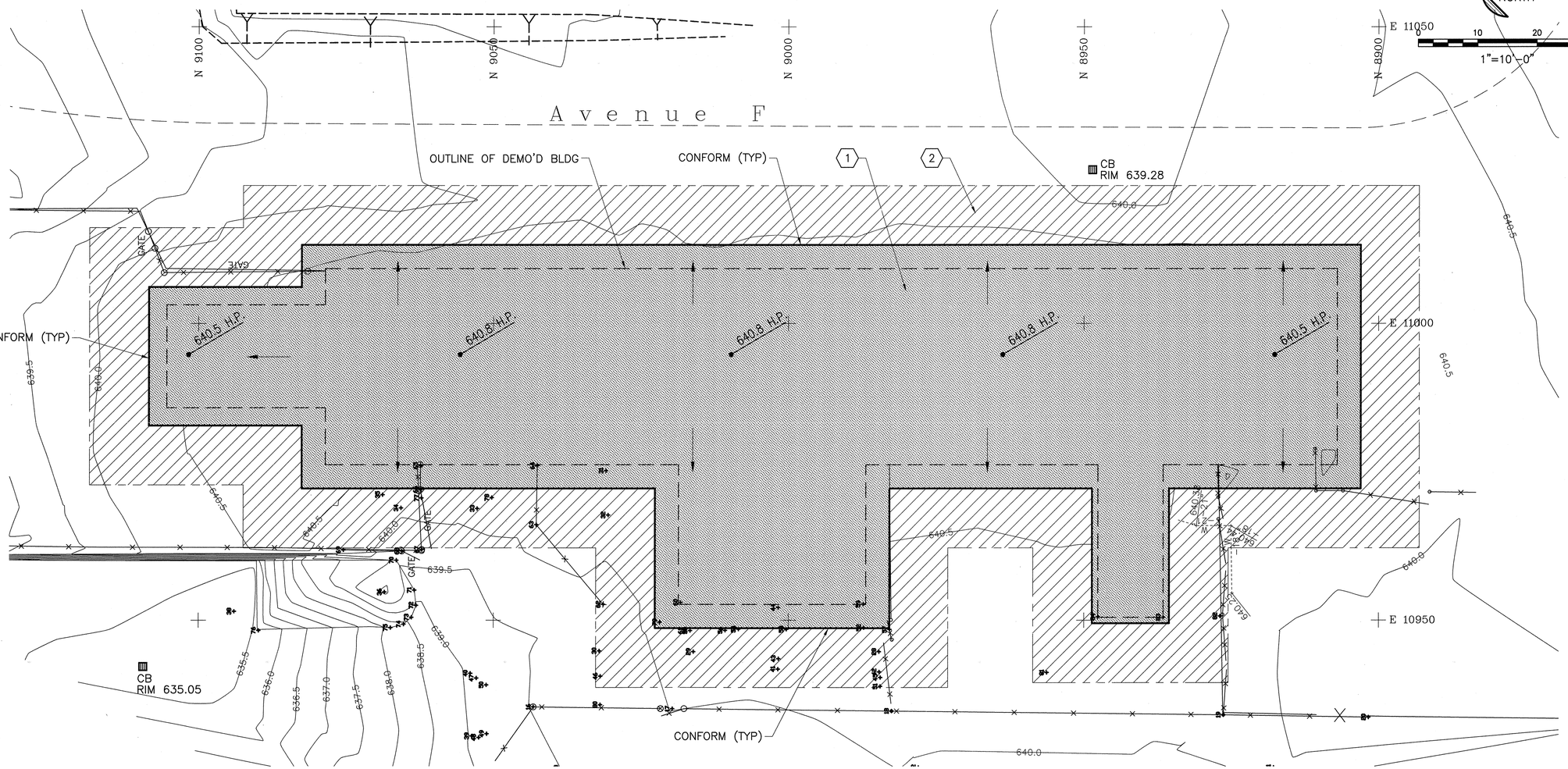
LLNL-MISC-673572

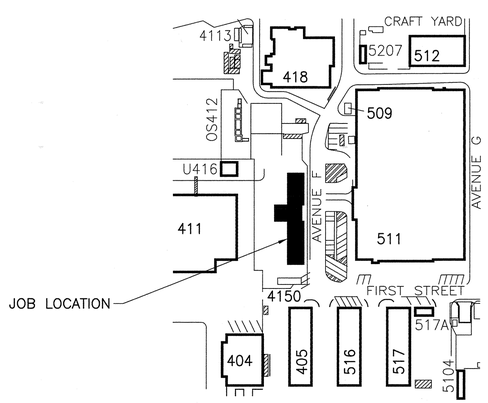
Building 419 Asphalt Grading Plan

September 2012

Lawrence Livermore National Laboratory

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.





SITE PLAN

SCALE: NONE

GENERAL NOTES

A. ONSITE FIELD VERIFICATION OF ALL DIMENSIONS AND CONDITIONS SHALL BE THE RESPONSIBILITY OF THE SUBCONTRACTOR. NOTED DIMENSIONS AND COORDINATES TAKE PRECEDENCE OVER SCALE.

B. AGGREGATE BASE (AB) SHALL BE CLASS 2 PER CALTRANS STANDARD SPECIFICATION SECTION 26.

C. ASPHALT CONCRETE (AC) SHALL BE ½" MAXIMUM, TYPE A, MEDIUM GRADING AGGREGATE WITH PG64–10 BINDER.

D. TRAFFIC CONTROL SHALL CONFORM TO CALTRANS CA MUTCD.

KEY NOTES

(1) NEW AC PAVING. SEE DETAIL C6/C–501.

(2) PATCH OR REPAIR DAMAGED ASPHALT 10 FEET BEYOND EDGE OF NEW AC PAVING. SEE DETAIL E6/C–501.

LEGEND

(N) AC PAVING, SEE DETAIL C6/C–501

(E) AC TO BE REPAIRED AS REQ'D

600 — EXISTING CONTOUR ELEVATION

599.50 — NEW SPOT ELEVATION

DIRECTION OF GRADING/SLOPE

AB — AGGREGATE BASE

AC — ASPHALT CONCRETE

HP — HIGH POINT

Lawrence Livermore National Laboratory
P.O. Box 808 Livermore, California 94551

F&I Facilities & Infrastructure

Consultants

PE Stamps

REGISTERED PROFESSIONAL ENGINEER MARK SAMPSON C067716 Exp. 1-31-13 CIVIL STATE OF CALIFORNIA
10/3/12

Project Title

BUILDING 419
RCRA PHASE 2
PROJECT RESTORATION

REV No	DATE	REVISIONS	DWN BY	CHK BY

Des: L. MONTERO		9/28/12
Dwn: L. MONTERO		9/28/12
Chk: M. Sampson		10/3/12
File Name: PLC2012-0099-0001D.dwg		
DTN:	Scale: AS NOTED	Software: AutoCAD 2009

Sheet Title

GRADING PLAN

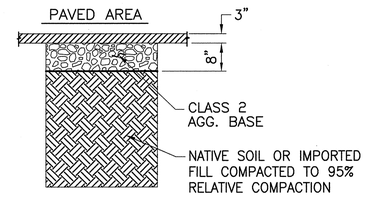
Dwg. No. PLC2012-0099-0001D Rev.

Sht. No. C-101 of

Classification
UNCLASSIFIED/UNLIMITED RELEASE

REV. D

Dwg. No. PLC2012-0099-0001D

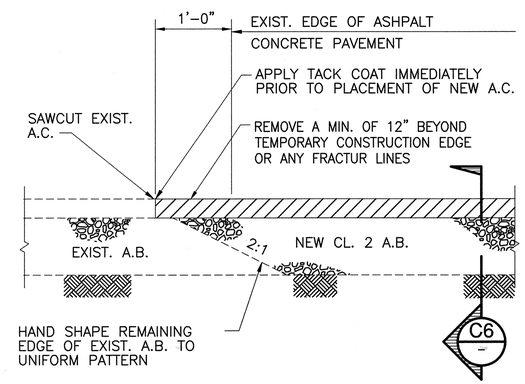


NOTES:

1. ASPHALT CONCRETE PAVING SHALL BE SAW CUT IN NEAT PARALLEL LINES AND A "TACK COAT" APPLIED BEFORE PAVING.

C6 / C-101 **NEW AC PAVING DETAIL**

SCALE: NONE



E6 / C-101 **PAVEMENT REPAIR - SECTION**

SCALE: NONE

Lawrence Livermore National Laboratory
P.O. Box 808 Livermore, California 94551

F&I Facilities & Infrastructure

Consultants

PE Stamps

REGISTERED PROFESSIONAL ENGINEER MARK SAMPSON 10/04/2018 Exp. 3-31-13 CIVIL STATE OF CALIFORNIA
10/3/12

Project Title

BUILDING 419
RCRA PHASE 2
PROJECT RESTORATION

REV No	DATE	REVISIONS	DWN BY	CHK BY

Des: L. MONTERO		10/3/12
Dwn: L. MONTERO		10/3/12
Chk: M Sampson		10/3/12
File Name: PLC2012-0099-0002D.dwg		
DTN:	Scale: AS NOTED	Software: AutoCAD 2009

Sheet Title

DETAILS

Dwg. No. PLC2012-0099-0002D Rev.

Sht. No. C-501 of

Classification
UNCLASSIFIED/UNLIMITED RELEASE

REV. 0
Dwg. No. PLC2012-0099-0002D

Environmental Functional Area, Lawrence Livermore National Laboratory
P.O. Box 808, L-627, Livermore, California 94551

Appendix T

Shipping Documents

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-169678 DATE: 02/13/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: LOU GREGORY (702) 295-9393
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				36,300 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			36,300 lb 16,466 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13050
Container Number Q00253758
Bin Number GFLU001622

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 02/13/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500646, 500650

Placards Required RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per Dean Roberts Date 2-13-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-169677 DATE: 02/11/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: LOU GREGORY (702) 295-9393
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				36,180 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			36,180 lb 16,411 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13049
Container Number Q00253757
Bin Number GFLU001085

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 02/11/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain ____
- [ ] Driver, pallets containing ____

Vehicle/Car No:

Seal: 500521, 500523

Placards Required RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 2-11-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166921 DATE: 02/11/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: LOU GREGORY (702) 295-9393
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				33,340 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			33,340 lb 15,123 kg

FREIGHT CHARGES ARE:
[X] Prepaid
[ ] Collect
[ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13048
Container Number Q00261602
Bin Number GFLU001010

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 02/11/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
[ ] Shipper
[ ] Driver, Loose pieces
[ ] Driver, pallet said to contain_____
[ ] Driver, pallets containing_____

Vehicle/Car No: 500199
Seal: 500721, ~~500733~~ ABZ

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per Troy Ryllt Date 2-11-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166920 DATE: 02/11/2013

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				40,600 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			40,600 lb 18,416 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13047
Container Number Q00261601
Bin Number MHFU001423

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 02/11/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500528, 500724

Placards Required Label(s) applied

RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per Kean Roberts Date 2-11-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166427 DATE: 02/04/2013

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				35,790 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			35,790 lb 16,235 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13040
Container Number Q00261594
Bin Number GFLU001062

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 02/04/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500193, 500622

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV INTERSTATE VENTURES INC

Per [signature] Date 2-4-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166416 DATE: 02/06/2013

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				39,670 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			39,670 lb 17,995 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13033
Container Number Q00261587
Bin Number GFLU000349

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500198, 500555

Placards Required: RADIOACTIVE

Label(s) applied

Shipper, Acting under contract with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per RICHARD B LODEN Date 02/06/2013

Carrier ITSV / INTERSTATE VENTURES INC

Per Jeff [illegible] Date 2-6-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166415 DATE: 02/06/2013

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				39,770 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			39,770 lb 18,040 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13032
Container Number Q00261586
Bin Number GFLU001363

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 02/06/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500197, 500558

Placards Required Label(s) applied

RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 2-6-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166414 DATE: 02/06/2012

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				35,550 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			35,550 lb 16,126 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13031
Container Number Q00261585
Bin Number GFLU001141

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 02/06/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500196, 500556

Placards Required Label(s) applied

RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 2-6-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166413 DATE: 02/04/2013

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				39,560 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			39,560 lb 17,945 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13030
Container Number Q00261584
Bin Number GRLU000258

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 02/04/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500194, 500628

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per Terry Reynolds Date 2-4-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166412 DATE: 02/04/2013

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				41,050 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			41,050 lb 18,620 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13029
Container Number Q00261583
Bin Number GFLU001299

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 02/04/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500200, 500551

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per Sean Roberts Date 2-4-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166323 DATE: 12/10/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				40,030 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			40,030 lb 18,158 kg

FREIGHT CHARGES ARE:
[X] Prepaid
[ ] Collect
[ ] 3rd Party
(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13028
Container Number Q00261582
Bin Number GFLU001084

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 12/10/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
[ ] Shipper
[ ] Driver, Loose pieces
[ ] Driver, pallet said to contain_____
[ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500159, 500687

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per Terry Reynolds Date 12-10-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166319 DATE: 12/10/2012

Shipper (from)	Consignee (to)	
LAWRENCE LIVERMORE NATL LAB FOR NNSA 7000 EAST AVENUE LIVERMORE CA 94550- TECHNICAL CONTACT: Rich Loden JOB/WORK ORDER: Project/Task 33824/B419.6.3 ROUTE:	NSTEC FOR THE US DOE WASTE MANAGEMENT NEVADA NATIONAL SECURITY SITE - ZONE 2 MERCURY NV 89023- CONTACT NAME: ED TAKAHASHI (702) 295-6100 REFERENCE #:	** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				37,150 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			37,150 lb 16,851 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13024
Container Number Q00261578
Bin Number GFLU001042

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per RICHARD B LODEN Date 12/10/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500158, 500160

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per _____ Date 12-10-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166317 DATE: 12/10/2012

Shipper (from)	Consignee (to)	
LAWRENCE LIVERMORE NATL LAB FOR NNSA 7000 EAST AVENUE LIVERMORE CA 94550- TECHNICAL CONTACT: Rich Loden JOB/WORK ORDER: Project/Task 33824/B419.6.3 ROUTE:	NSTEC FOR THE US DOE WASTE MANAGEMENT NEVADA NATIONAL SECURITY SITE - ZONE 2 MERCURY NV 89023- CONTACT NAME: ED TAKAHASHI (702) 295-6100 REFERENCE #:	** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				40,390 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			40,390 lb 18,321 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13023
Container Number Q00261577
Bin Number GFLU000357

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 12/10/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500151, 500557

Placards Required RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per Kean Roberts Date 12-10-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166226 DATE: 12/12/2012

Shipper (from)	Consignee (to)	
LAWRENCE LIVERMORE NATL LAB FOR NNSA 7000 EAST AVENUE LIVERMORE CA 94550- TECHNICAL CONTACT: Rich Loden JOB/WORK ORDER: Project/Task 33824/B419.6.3 ROUTE:	NSTEC FOR THE US DOE WASTE MANAGEMENT NEVADA NATIONAL SECURITY SITE - ZONE 2 MERCURY NV 89023- CONTACT NAME: ED TAKAHASHI (702) 295-6100 REFERENCE #:	** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				42,080 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			42,080 lb 19,088 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13020
Container Number Q00261574
Bin Number GFLU000408

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 12/12/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500155, 500681

Placards Required RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 12-12-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166224 DATE: 12/12/2012

Shipper (from)	Consignee (to)	
LAWRENCE LIVERMORE NATL LAB FOR NNSA 7000 EAST AVENUE LIVERMORE CA 94550- TECHNICAL CONTACT: Rich Loden JOB/WORK ORDER: Project/Task 33824/B419.6.3 ROUTE:	NSTEC FOR THE US DOE WASTE MANAGEMENT NEVADA NATIONAL SECURITY SITE - ZONE 2 MERCURY NV 89023- CONTACT NAME: ED TAKAHASHI (702) 295-6100 REFERENCE #:	** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				35,970 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			35,970 lb 16,316 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13018
Container Number Q00261572
Bin Number GFLU001149

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 12/12/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500156, 500690

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per Terry Reynolds Date 12-12-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166183A DATE: 01/30/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				34,880 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			34,880 lb 15,822 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13015
Container Number Q00261569
Bin Number GFLU001087

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/30/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500189, 500693

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per _____ Date 1/30/13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166182 DATE: 12/12/2012

Shipper (from)	Consignee (to)	
LAWRENCE LIVERMORE NATL LAB FOR NNSA 7000 EAST AVENUE LIVERMORE CA 94550- TECHNICAL CONTACT: Rich Loden JOB/WORK ORDER: Project/Task 33824/B419.6.3 ROUTE:	NSTEC FOR THE US DOE WASTE MANAGEMENT NEVADA NATIONAL SECURITY SITE - ZONE 2 MERCURY NV 89023- CONTACT NAME: ED TAKAHASHI (702) 295-6100 REFERENCE #:	** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				34,640 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			34,640 lb 15,713 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13014
Container Number Q00261568
Bin Number GFLU001103

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 12/12/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500157, 500685

Placards Required Label(s) applied

RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 12-12-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166181 DATE: 01/30/2013

Shipper (from)	Consignee (to)	
LAWRENCE LIVERMORE NATL LAB FOR NNSA 7000 EAST AVENUE LIVERMORE CA 94550- TECHNICAL CONTACT: Rich Loden JOB/WORK ORDER: Project/Task 33824/B419.6.3 ROUTE:	NSTEC FOR THE US DOE WASTE MANAGEMENT NEVADA NATIONAL SECURITY SITE - ZONE 2 MERCURY NV 89023- CONTACT NAME: ED TAKAHASHI (702) 295-6100 REFERENCE #:	** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				40,100 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			40,100 lb 18,190 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13013
Container Number Q00261567
Bin Number GFLU000278

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/30/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500195, 500701

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per Ted Ritter Date 1-30-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166180 DATE: 01/30/2013

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				38,160 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			38,160 lb 17,310 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13012
Container Number Q00251566
Bin Number GFLU001163

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/30/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500191, 500705

Placards Required Label(s) applied

RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per Jean Roberts Date 1-30-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166130 DATE: 01/28/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				36,910 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			36,910 lb 16,743 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13009
Container Number Q00261563
Bin Number GFLU001038

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/28/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500594, 500703

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 1-28-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166129A DATE: 01/28/2013

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				38,710 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			38,710 lb 17,559 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13008
Container Number Q00261562
Bin Number GPLU001125

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/28/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain _____
- [ ] Driver, pallets containing _____

Vehicle/Car No:

Seal: 500591, 500691

Placards Required Label(s) applied

RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per _____ Date 1-28-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166126 DATE: 01/28/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				39,420 lb
1	<<<Total Pieces		IN THE EVENT OF EMERGENCY, TELEPHONE 1-(925)423-4205 - 24 HRS Contact or Registrant Name, or Contract Number LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			39,420 lb 17,881 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13005
Container Number Q00253754
Bin Number GFLU000002

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/28/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500185, 500706

Placards Required RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per Kean Roberts Date 1-28-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-170620 DATE: 02/27/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Kimberly A. Fugmann
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: LOU GREGORY (702) 295-9393
REFERENCE #:

** *TSMT*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	IP1 BOX	X	UN2910, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 22.9 Megabecquerels; solid, oxide; Fissile Excepted, Q00261559, seal 500593 DOT EMERGENCY RESPONSE GUIDE #161 ATTACHED				17,520 lb
1	IP1 BOX	X	UN2913, RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-II), 7, H-3, 269 Gigabecquerrels, solid, oxide, Q00250478, seal LLNL500900 DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				9,080 lb
2	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			26,600 lb 12,066 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13057

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:
LAWRENCE LIVERMORE NATL LAB
Per KIMBERLY A. FUGMANN Date 02/27/2013

Trailer Loaded by: [ ] Shipper [ ] Driver
Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:
Seal:

Placards Required Label(s) applied
RADIOACTIVE

Carrier TSMT / TRI-STATE MOTOR TRANSIT
Per E D Strode Date 2-27-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166919 DATE: 01/14/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				29,440 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			29,440 lb 13,354 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13046
Container Number Q00261600
Bin Number GFLU001083

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain _____
- [ ] Driver, pallets containing _____

Vehicle/Car No:

Seal: 500182, 500583

Placards Required: RADIOACTIVE

Label(s) applied

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/14/2013

Carrier ITSV / INTERSTATE VENTURES INC

Per Jean Roberts Date 1-14-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166918 DATE: 01/09/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				26,640 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			26,640 lb 12,084 kg

FREIGHT CHARGES ARE:
[X] Prepaid
[ ] Collect
[ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13045
Container Number Q00261599
Bin Number GFLU001151

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/09/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
[ ] Shipper
[ ] Driver, Loose pieces
[ ] Driver, pallet said to contain
[ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500599, 500800

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV INTERSTATE VENTURES INC

Per Date 1-9-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166692A DATE: 01/09/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				36,150 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			36,150 lb 16,398 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13044
Container Number Q00261598
Bin Number GFLU001167

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500600, 500792

Placards Required Label(s) applied
RADIOACTIVE

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/09/2013

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 1-9-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166691 DATE: 11/26/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				35,960 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			35,960 lb 16,312 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13043
Container Number Q00261597

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 11/26/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500781, 500791

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV INTERSTATE VENTURES INC

Per _____ Date 11-26-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166690 DATE: 11/26/2012

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				39,260 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			39,260 lb 17,809 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

FOR: NNSA

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13042
Container Number Q00261596

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per RICHARD B LODEN *Richard B Loden* Date 11/26/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain _____
- [ ] Driver, pallets containing _____

Vehicle/Car No:

Seal: 500785, 500786

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per *Terry Reynolds* Date 11-26-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166688 DATE: 11/28/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				42,490 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			42,490 lb 19,274 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13041
Container Number Q00261595

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500711, 500788

Placards Required Label(s) applied
RADIOACTIVE

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 11/28/2012

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 11-28-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166426 DATE: 11/26/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				38,550 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			38,550 lb 17,486 kg

FREIGHT CHARGES ARE:
[X] Prepaid
[ ] Collect
[ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13039
Container Number Q00261593

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
[ ] Shipper
[ ] Driver, Loose pieces
[ ] Driver, pallet said to contain
[ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500782, 500790

Placards Required: RADIOACTIVE

Label(s) applied

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 11/26/2012

Carrier ITSV / INTERSTATE VENTURES INC

Per Jean Roberts Date 11-26-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166425 DATE: 11/28/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				39,280 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			39,280 lb 17,818 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13038
Container Number Q00261592

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 11/28/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain _____
- [ ] Driver, pallets containing _____

Vehicle/Car No:

Seal: 500783, 500794

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per _____ Date 11/28/12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166424 DATE: 11/28/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				40,710 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			40,710 lb 18,466 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13037
Container Number Q00261591

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 11/28/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500713, 500716

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per Dean Roberts Date 11-28-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166423 DATE: 01/14/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				37,100 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			37,100 lb 16,829 kg

FREIGHT CHARGES ARE:
[X] Prepaid
[ ] Collect
[ ] 3rd Party
(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13036
Container Number Q00261590
Bin Number GFLU001108

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per RICHARD B LODEN Richard B Loden Date 01/14/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
[ ] Shipper
[ ] Driver, Loose pieces
[ ] Driver, pallet said to contain_____
[ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500596, 500783

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 1-14-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166422 DATE: 01/09/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				41,300 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			41,300 lb 18,734 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13035
Container Number Q00261589
Bin Number GFLU001178

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500597, 500795

Placards Required RADIOACTIVE

Label(s) applied

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per RICHARD B LODEN Date 01/09/2013

Carrier ITSV / INTERSTATE VENTURES INC

Per Jean Roberts Date 1-9-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166417A DATE: 01/14/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				39,280 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			39,280 lb 17,818 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13034
Container Number Q00261588
Bin Number GFLU000361

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500186, 500797

Placards Required Label(s) applied
RADIOACTIVE

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/14/2013

Carrier ITSV / INTERSTATE VENTURES INC

Per Terry Rafferty Date 1-14-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166322 DATE: 12/19/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				41,520 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			41,520 lb 18,834 kg

FREIGHT CHARGES ARE:
[X] Prepaid
[ ] Collect
[ ] 3rd Party
(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13027
Container Number Q00261581
BIN NR CFLU001183
RB

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:
LAWRENCE LIVERMORE NATL LAB
Per Richard B Loden RICHARD B LODEN Date 12/19/2012

Trailer Loaded by: [ ] Shipper [ ] Driver
Freight Counted by:
[ ] Shipper
[ ] Driver, Loose pieces
[ ] Driver, pallet said to contain
[ ] Driver, pallets containing
Vehicle/Car No:
Seal: 50015~~7~~3, 50067~~1~~4 RB

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC
Per [signature] Date 12-19-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

GFL4001056

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166321 DATE: 12/17/2012

Shipper (from)	Consignee (to)	
LAWRENCE LIVERMORE NATL LAB FOR NNSA 7000 EAST AVENUE LIVERMORE CA 94550- TECHNICAL CONTACT: Rich Loden JOB/WORK ORDER: Project/Task 33824/B419.6.3 ROUTE:	NSTEC FOR THE US DOE WASTE MANAGEMENT NEVADA NATIONAL SECURITY SITE - ZONE 2 MERCURY NV 89023- CONTACT NAME: ED TAKAHASHI (702) 295-6100 REFERENCE #:	** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				36,290 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			36,290 lb 16,461 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13026
Container Number Q00261580

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 12/17/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500184, 500686

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 12-17-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166320 DATE: 12/19/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				39,000 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			39,000 lb 17,691 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13025
Container Number Q00261579
Bin # GFLU001179
ABZ

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:
Seal: 50015, 50067 ABZ

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC
Per Terry Ryll Date 12-19-12

Shipper, Acting under contract [ ] with the U.S. Department of Energy:
LAWRENCE LIVERMORE NATL LAB
Per Richard B Loden RICHARD B LODEN Date 12/19/2012

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166228 DATE: 01/16/2013

Shipper (from)

LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)

NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				37,970 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			37,970 lb 17,223 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13022
Container Number Q00261576
Bin Number GFLU001223

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500598, 500667

Placards Required Label(s) applied
RADIOACTIVE

Shipper, Acting under contract with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/16/2013

Carrier ITSV INTERSTATE VENTURES INC

Per Dean Roberts Date 1-16-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

GFLU001073

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166227 DATE: 12/17/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				42,520 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			42,520 lb 19,287 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13021
Container Number Q00261575

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per RICHARD B LODEN Date 12/17/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500152, 500673

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per _____ Date 12-7-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166225A DATE: 01/07/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				35,100 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			35,100 lb 15,922 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13019
Container Number Q00261573
Bin Number GFLU001112

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per RICHARD B LODEN Date 01/07/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500188, 500665

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per _____ Date 1/7/13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166223A DATE: 01/07/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				42,170 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			42,170 lb 19,128 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13017
Container Number Q00261571
Bin Number CVGU001192

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Placards Required: RADIOACTIVE

Label(s) applied

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/07/2013

Vehicle/Car No:

Seal: 500190, 500662

Carrier ITSV / INTERSTATE VENTURES INC

Per Jean Roberts Date 1-7-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166184 DATE: 01/16/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				37,600 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			37,600 lb 17,056 kg

FREIGHT CHARGES ARE:
[X] Prepaid
[ ] Collect
[ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13016
Container Number Q00261570
Bin Number GFLU001185

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
[ ] Shipper
[ ] Driver, Loose pieces
[ ] Driver, pallet said to contain
[ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500592, 500668

Placards Required RADIOACTIVE

Label(s) applied

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/16/2013

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 1-16-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166179 DATE: 12/19/2012

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				37,860 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			37,860 lb 17,174 kg

FREIGHT CHARGES ARE:
[X] Prepaid
[ ] Collect
[ ] 3rd Party
(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13011
Container Number Q00261565
BID# GFLU001055
RBL

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 12/19/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
[ ] Shipper
[ ] Driver, Loose pieces
[ ] Driver, pallet said to contain_____
[ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500183, 500675

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per _____ Date 12-19-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

GF-W000374

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166135 DATE: 12/17/2012

Shipper (from)	Consignee (to)	
LAWRENCE LIVERMORE NATL LAB FOR NNSA 7000 EAST AVENUE LIVERMORE CA 94550- TECHNICAL CONTACT: Rich Loden JOB/WORK ORDER: Project/Task 33824/B419.6.3 ROUTE:	NSTEC FOR THE US DOE WASTE MANAGEMENT NEVADA NATIONAL SECURITY SITE - ZONE 2 MERCURY NV 89023- CONTACT NAME: ED TAKAHASHI (702) 295-6100 REFERENCE #:	** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				38,730 lb
1	<<<Total Pieces		IN THE EVENT OF EMERGENCY, TELEPHONE 1-(925)423-4205 - 24 HRS Contact or Registrant Name, or Contract Number LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			38,730 lb 17,568 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13010
Container Number Q00261564

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 12/17/2012

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500181, 500679

Placards Required: RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 12-17-12

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166128 DATE: 01/16/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				40,920 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			40,920 lb 18,562 kg

FREIGHT CHARGES ARE:
- [X] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[X] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13007
Container Number Q00261561
Bin Number GFLU001126

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract [ ] with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/16/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain
- [ ] Driver, pallets containing

Vehicle/Car No:

Seal: 500595, 500694

Placards Required RADIOACTIVE

Label(s) applied

Carrier ITSV / INTERSTATE VENTURES INC

Per Troy Ryckman Date 1-16-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable SHIPPERS NUMBER L-166127 DATE: 01/07/2013

Shipper (from)
LAWRENCE LIVERMORE NATL LAB FOR NNSA
7000 EAST AVENUE
LIVERMORE CA 94550-
TECHNICAL CONTACT: Rich Loden
JOB/WORK ORDER: Project/Task 33824/B419.6.3
ROUTE:

Consignee (to)
NSTEC FOR THE US DOE
WASTE MANAGEMENT
NEVADA NATIONAL SECURITY SITE - ZONE 2
MERCURY NV 89023-
CONTACT NAME: ED TAKAHASHI (702) 295-6100
REFERENCE #:

** *ITSV*

No. Shipping Units	Type of Package	HM	Description of Articles, Special Marks, and Exceptions (Subject to Correction)	NMFC Item No.	Class	Rate	Weight (Subject to correction)
1	ROLL	X	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, Ag-110m, Am-241, Ce-144, Cm-244, Co-56, Co-57, Cs-137, Depleted-U, Eu-154, Fe-59, H-3, K-40, Na-22, Nb-95, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Sc-46, Sr-90, Th-232; 1.28 Gigabecquerels; solid, oxide; Fissile Excepted DOT EMERGENCY RESPONSE GUIDE #162 ATTACHED				37,780 lb
1	<<<Total Pieces		*IN THE EVENT OF EMERGENCY, TELEPHONE* 1-(925)423-4205 - *24 HRS* *Contact or Registrant Name, or Contract Number* LLNL Emergency Dispatch	In the event of damage or loss of the material described in this Bill of Lading while in the possession of the carrier, the carrier agrees to notify the shipper/consignor within two hours.			37,780 lb 17,137 kg

FREIGHT CHARGES ARE:
- [x] Prepaid
- [ ] Collect
- [ ] 3rd Party

(see Remarks)

If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by, the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges (41 CFR 109-40.50 and 41 CFR 109-40.3)

[x] Yes [ ] No

SECTION 13712/10721 RATES APPLY - TENDER NO.

Remarks:
Exclusive Use Shipment
LLNL Shipment Number LLL13006
Container Number Q00261560
Bin Number GFLU001145

Received, subject to individually determined rates or contracts that have been agreed upon in writing between the carrier and shipper, if applicable, otherwise to the rates, classifications and rules that have been established by the carrier and are available to the shipper, on request. The property described above, in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned and destined as shown herein, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, unless otherwise specifically stated in individually determined rates and contracts that have been agreed upon in writing between the carrier and shipper, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at anytime interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies they are familiar with all terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for him/herself and their assigns.

This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation (Applicable for Hazardous Materials Only)

Shipper, Acting under contract _____ with the U.S. Department of Energy:

LAWRENCE LIVERMORE NATL LAB

Per Richard B Loden RICHARD B LODEN Date 01/07/2013

Trailer Loaded by: [ ] Shipper [ ] Driver

Freight Counted by:
- [ ] Shipper
- [ ] Driver, Loose pieces
- [ ] Driver, pallet said to contain_____
- [ ] Driver, pallets containing_____

Vehicle/Car No:

Seal: 500187, 500664

Placards Required Label(s) applied
RADIOACTIVE

Carrier ITSV / INTERSTATE VENTURES INC

Per [signature] Date 1-7-13

TRANSPORTATION DEPARTMENT - PERMANENT POST OFFICE ADDRESS OF SHIPPER

Bin Number: GFLU2106 65

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4206, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? [ ] YES [x] NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? [ ] YES [x] NO
If "Yes," provide Manifest Number ====> 005885097 JJK

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No. 0110000015

SHIPMENT NUMBER 9063-11-0049

CONTACT: Rich Loden

6. CARRIER – Name and Address
~~Victoryy Solutions LLC~~ Philip West Industrial Services
~~144 Union Valley Rd Suite B Oak Ridge, TN 37830~~
1802 Sherman Dr. Vallejo, CA 94623

CONTACT: Dispatch

SIGNATURE – Authorized carrier acknowledging waste receipt: Bill Hanson

SHIPPER I.D. NUMBER: CA2890012584

[ ] COLLECTOR
[ ] PROCESSOR
[x] GENERATOR TYPE (Specify) G

TELEPHONE NUMBER (Include Area Code): (925) 422-1926

EPA I.D. NUMBER: ~~NAD000626897~~ CAD980817507

SHIPPING DATE: 12-27-10

TELEPHONE (Include Area Code): 865-482-3898

DATE: 12-27-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0049

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: M11566

DATE: 12/28/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-27-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	27180 LBS; 540 FT3	Q00250812
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
X No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility licenses.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	15.2911	kg	10405.8632	NP	NP	2.9147E-05	2.9147E-05
	ft3	540.0000	ton	11.4705			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0049

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (F > 0.1%)	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250812/CA2890012584	2	15.2911	12328.6414	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	1.97000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	13.5900	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	1.34000E-01	5.1430E-02	1.3900E-03	
												H-3	1.40000E+02	5.3650E+01	1.4500E+00	
												K-40	5.36000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	7.78000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.65000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.80000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.12000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.49000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	5.25000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	9.85000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		15.2911	12328.6414									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		540.0000	13.5900									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0049
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: GFLU2105

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ====> 005865091 JJK

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0048
CONTACT: Rich Loden

6. CARRIER – Name and Address: ~~ChrisCo West Industrial Services, 1863 Shelton Drive, Hollister, CA 95023~~ Triad Transport Inc, 1630 Diesel Ave, McAlester, OK 74501
CONTACT: DISPATCH
SIGNATURE – Authorized carrier acknowledging waste receipt: Martin Trush

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR ☐ PROCESSOR ☑ GENERATOR TYPE (Specify): G
TELEPHONE NUMBER (Include Area Code): (925) 422-1925
EPA I.D. NUMBER: OKD 081587911
SHIPPING DATE: 01/04/11 to 1/23/11
TELEPHONE (Include Area Code): 800-334-4966 ext 1172
DATE: 01-04-11

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0048

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11592

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt
DATE: 1/5/11

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 1/4/11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	24860 LBS; 540 FT3	Q00250813
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST.) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-05)

FORM 541 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911	kg 9353.5289	NP	NP	2.9147E-05	2.9147E-05
	ft3 540.0000	ton 10.3105			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0048

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES		pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250813/CA2890012584	2	15.2911	11276.3071	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241		2.19000E-02	7.5850E-03	2.0500E-04	AU
												Am-243		1.49000E-01	5.1430E-02	1.3900E-03	
												H-3		1.55000E+02	5.3650E+01	1.4500E+00	
		540.0000	12.4300	1.0000E-01	0.0000E+00	NP		540.0000				K-40		5.96000E+01	2.0609E+01	5.5700E-01	
												Pu-238	[4.6700E-09 g]	8.65000E-03	2.9970E-03	8.1000E-05	
												Pu-239	[2.7300E-05 g]	1.83000E-01	6.3270E-02	1.7100E-03	
												Pu-240	[1.7200E-06 g]	4.23000E-02	1.4652E-02	3.9600E-04	
												Pu-241	[1.1100E-07 g]	1.25000E+00	4.3290E-01	1.1700E-02	
												Pu-242	[1.1700E-08 g]	5.00000E-06	1.7316E-06	4.6800E-08	
												Th-232	[4.9200E-01 kg]	5.84000E+00	2.0202E+00	5.4600E-02	
												U-Nat	[1.4500E-01 kg]	1.10000E+01	3.8110E+00	1.0300E-01	
												Subtotal			8.0663E+01	2.1801E+00	
												Total			8.0663E+01	2.1801E+00	
												SNM	[2.9147E-05 g]				
												Source	[6.3700E-01 kg]				
Shipment Totals		15.2911	11276.3071									SNM	[2.9147E-05 g]		8.0663E+01	2.1801E+00	
												Source	[6.3700E-01 kg]				
		540.0000	12.4300														

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0048
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: GFLU001471

TR 114

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005865088 WK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000016
SHIPMENT NUMBER: 9063-11-0047

CONTACT: Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012564
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G
TELEPHONE NUMBER (Include Area Code): (925) 422-1928

EPA I.D. NUMBER: NMR000013006
SHIPPING DATE: 12/21/10
TELEPHONE (Include Area Code): 865-482-3896
DATE: 12-21-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0047

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11551

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE: 12-22-10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/21/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	18060 LBS; 678 FT3	Q00250814
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. ___ HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) X is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1. 12-22

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	4817.6049	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	5.3105			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0047

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250814/CA2890012584	2	19.1988	8191.8787	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	4.14000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	9.0300	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	2.82000E-01	5.1430E-02	1.3900E-03	
												H-3	2.94000E+02	5.3650E+01	1.4500E+00	
												K-40	1.13000E+02	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	1.64000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	3.46000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	8.00000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.36000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	9.46000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.10000E+01	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	2.07000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	8191.8787									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	9.0300									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification
90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0047
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865088 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0135
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	18060	P	352		
						F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0047, Ship Doc # L-143837, Container # Q00250814, Bin # GFLU001471
EMERGENCY CONTACT 925-423-4205, CONTACT NAME LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 21 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 12 Day 21 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: BKRU025985

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number: 005065075 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0046
CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
PhilZip West Industrial Services
1802 Shelton Drive
Hollister, CA 95023

CONTACT: Dispatch
TELEPHONE (Include Area Code): 800-321-1030
SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 12-17-10

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G
EPA I.D. NUMBER: CAR000177527
SHIPPING DATE: 12-17-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0046

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11587

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt
DATE: 12-29-10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [illegible]
TITLE: Shipping Coordinator
DATE: 12-17-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	16. TOTAL PACKAGE ACTIVITY Ci	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 Ci/l)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0883E+01	2.1801E+00	NA	35380 LBS; 678 FT3	Q00250811
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

BD 122910

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ___ (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	12701.0408	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	14.0005			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0046

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
												RADIONUCLIDES	pCi/gm	MBq	mCi	
Q00250811/CA2890012584	2	19.1988	16048.0991	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100	Oxide/NP	NP	Am-241	1.61000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	17.6900	1.0000E-01	0.0000E+00	NP		678.0000	100			Am-243	1.10000E-01	5.1430E-02	1.3900E-03	
												H-3	1.14000E+02	5.3650E+01	1.4500E+00	
												K-40	4.39000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.37000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.35000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.11000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.20000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.68000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.30000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.07000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	16048.0991									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	17.6900									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0046
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: BKRU025556

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number: 005885071 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR ☐ PROCESSOR ☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0045

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1926

6. CARRIER – Name and Address
Phillip West Industrial Services
1802 Shelton Drive
Hollister, CA 95023

EPA I.D. NUMBER: CAR000177527
SHIPPING DATE: 12.17.10

CONTACT:
TELEPHONE (Include Area Code): 800-321-1030

SIGNATURE – Authorized carrier acknowledging waste receipt:
DATE: 12-17-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0045

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11586

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt:
DATE: 12-29-10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: TITLE: Shipping Cordinator DATE: 12.17.10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	36660 LBS; 678 FT3	Q00249431
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	13317.9265	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	14.6805			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0045

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249431/CA2890012584	2	19.1988	16628.6974	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100	Oxide/NP	NP	Am-241	1.54000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	18.3300	1.0000E-01	0.0000E+00	NP		678.0000	100			Am-243	1.05000E-01	5.1430E-02	1.3900E-03	
												H-3	1.09000E+02	5.3650E+01	1.4500E+00	
												K-40	4.19000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.08000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.29000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	2.97000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.77000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.51000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.10000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.70000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	16628.6974									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	18.3300									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0045
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: BKRU025611

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====> EPA MANIFEST NUMBER: 005885072 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0044

CONTACT: Rich Loden

6. CARRIER – Name and Address
Phillip West Industrial Services
1802 Shelton Drive
Hollister, CA 95023

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER ID NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: CAR000177627

SHIPPING DATE: 12-17-10

TELEPHONE (Include Area Code): 800-321-1030

DATE: 12-17-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0044

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: M11584

DATE: 12/29/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-17-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0683E+01	2.1801E+00	NA	32860 LBS; 678 FT3	Q00250810
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST.) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 11394.6947 ton 12.5605	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0044

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250810/CA2890012584	2	19.1988	14905.0463	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.80000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	16.4300	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.22000E-01	5.1430E-02	1.3900E-03	
												H-3	1.27000E+02	5.3650E+01	1.4500E+00	
												K-40	4.89000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	7.10000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.50000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.47000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.03000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.10000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.79000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	9.00000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
Shipment Totals		19.1988	14905.0463									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	
		678.0000	16.4300													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Studges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0044
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: GFLU2107

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number: 005845088 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-784)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0043
CONTACT: Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT: Dispatch

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G
TELEPHONE NUMBER (Include Area Code): (925) 422-1925
EPA I.D. NUMBER: NMR000013088
SHIPPING DATE: 1-4-11
TELEPHONE (Include Area Code): 865-482-3896
DATE: 1-4-11

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0043

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11594

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE: 1/5/11

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 1/4/11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	8.1772E+01	2.2100E+00	NA	38300 LBS; 540 FT3	Q00250803

FOR CONSIGNEE USE ONLY

- ___ Record Waste Description Inadequate
- ___ Contamination or Leakage Detected
- ___ Unexpected Exposure Rates Detected
- ___ Labels, Markings, etc. Inadequate
- ___ Container Integrity Inadequate
- ___ Other
- ✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ___ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility licenses.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911 ft3 540.0000	kg 14542.6259 ton 16.0305	NP	NP	2.9580E-05 1 Container	2.9580E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.1772E+01	5.4390E+01	NP	NP	NP	(kg)	6.4600E-01
mCi	2.2100E+00	1.4700E+00	NP	NP	NP	(tons)	7.1209E-04

2. MANIFEST NUMBER 9063-11-0043

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250803/CA2890012584	2	15.2911	16455.4041	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	1.43000E-02	7.6960E-03	2.0800E-04	AU
		540.0000	18.1500	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	9.72000E-02	5.2170E-02	1.4100E-03	
												H-3	1.01000E+02	5.4390E+01	1.4700E+00	
												K-40	3.89000E+01	2.0905E+01	5.6500E-01	
												Pu-238 [4.7400E-09 g]	5.64000E-03	3.0377E-03	8.2100E-05	
												Pu-239 [2.7700E-05 g]	1.19000E-01	6.4380E-02	1.7400E-03	
												Pu-240 [1.7500E-06 g]	2.76000E-02	1.4837E-02	4.0100E-04	
												Pu-241 [1.1300E-07 g]	8.15000E-01	4.4030E-01	1.1900E-02	
												Pu-242 [1.1800E-08 g]	3.26000E-06	1.7538E-06	4.7400E-08	
												Th-232 [4.9900E-01 kg]	3.81000E+00	2.0461E+00	5.5300E-02	
												U-Nat [1.4700E-01 kg]	7.14000E+00	3.8480E+00	1.0400E-01	
												Subtotal		8.1772E+01	2.2100E+00	
												Total		8.1772E+01	2.2100E+00	
												SNM [2.9580E-05 g]				
												Source [6.4600E-01 kg]				
Shipment Totals		15.2911	16455.4041									SNM [2.9580E-05 g]		8.1772E+01	2.2100E+00	
		540.0000	18.1500									Source [6.4600E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seaven

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0043
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.6960E-03	2.0800E-04
Am-243	5.2170E-02	1.4100E-03
H-3	5.4390E+01	1.4700E+00
K-40	2.0905E+01	5.6500E-01
Pu-238	3.0377E-03	8.2100E-05
Pu-239	6.4380E-02	1.7400E-03
Pu-240	1.4837E-02	4.0100E-04
Pu-241	4.4030E-01	1.1900E-02
Pu-242	1.7538E-06	4.7400E-08
Th-232	2.0461E+00	5.5300E-02
U-Nat	3.8480E+00	1.0400E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865099 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1923 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	36300	P	352 F001		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0043, Ship Doc # L-143913, Container # Q00250803, Bin # CFLU2107
EMERGENCY CONTACT 925-423-4205, CONTACT NAME LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 1 Day 4 Year 11

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Waro Taylor
Signature:
Month 1 Day 4 Year 11
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: BKRU026436

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4206, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005888070 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015

SHIPMENT NUMBER: 9063-11-0042

CONTACT: Rich Loden

6. CARRIER – Name and Address
Philip West Industrial Services
1802 Shelton Drive
Hollister, CA 95023

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: CAR000177627

SHIPPING DATE: 12-17-10

TELEPHONE (Include Area Code): 800-321-1930

DATE: 12-17-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0042

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11583

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE: 12-29-10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-17-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 cm)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0883E+01	2.1801E+00	NA	33000 LBS; 678 FT3	Q00249443
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

12-29-10 [illegible]

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ✗ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST.) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	11648.7064	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	12.8405			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0042

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249443/CA2890012584	2	19.1988	14968.5492	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100	Oxide/NP	NP	Am-241	1.76000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	16.5000	1.0000E-01	0.0000E+00	NP		678.0000	100			Am-243	1.20000E-01	5.1430E-02	1.3900E-03	
												H-3	1.25000E+02	5.3650E+01	1.4500E+00	
												K-40	4.79000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.95000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.47000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.40000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.00000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.01000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.69000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.80000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	14968.5492									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	16.5000									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0042
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: GFLU2109

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005E83087 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER ID NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0041

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address: ~~Philip West Industrial Services~~ Triad Transport LLC
~~1802 Shelton Drive Hollister, CA 95023~~ 1630 Diesel Ave.
McAlester, OK 74501

EPA I.D. NUMBER: ~~CAD980173633~~ OKD 981588791
SHIPPING DATE: 1/6/11
CONTACT: DISPATCH
TELEPHONE (Include Area Code): ~~800-835-4888~~ 800 964 1159
SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 1-6-11

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0041

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11598

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE: 1-10-11

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 1/6/11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.1772E+01	2.2100E+00	NA	38540 LBS; 540 FT3	Q00250804
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911 ft3 540.0000	kg 14651.4881 ton 16.1505	NP	NP	2.9580E-05 1 Container	2.9580E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.1772E+01	5.4390E+01	NP	NP	NP	(kg)	6.4600E-01
mCi	2.2100E+00	1.4700E+00	NP	NP	NP	(tons)	7.1209E-04

2. MANIFEST NUMBER 9063-11-0041

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250804/CA2890012584	2	15.2911	16574.2663	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	1.42000E-02	7.6960E-03	2.0800E-04	AU
		540.0000	18.2700	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	9.64000E-02	5.2170E-02	1.4100E-03	
												H-3	1.00000E+02	5.4390E+01	1.4700E+00	
												K-40	3.86000E+01	2.0905E+01	5.6500E-01	
												Pu-238 [4.7400E-09 g]	5.60000E-03	3.0377E-03	8.2100E-05	
												Pu-239 [2.7700E-05 g]	1.19000E-01	6.4380E-02	1.7400E-03	
												Pu-240 [1.7500E-06 g]	2.74000E-02	1.4837E-02	4.0100E-04	
												Pu-241 [1.1300E-07 g]	8.09000E-01	4.4030E-01	1.1900E-02	
												Pu-242 [1.1800E-08 g]	3.24000E-06	1.7538E-06	4.7400E-08	
												Th-232 [4.9900E-01 kg]	3.78000E+00	2.0461E+00	5.5300E-02	
												U-Nat [1.4700E-01 kg]	7.09000E+00	3.8480E+00	1.0400E-01	
												Subtotal		8.1772E+01	2.2100E+00	
												Total		8.1772E+01	2.2100E+00	
												SNM [2.9580E-05 g] Source [6.4600E-01 kg]				
Shipment Totals		15.2911	16574.2663									SNM [2.9580E-05 g] Source [6.4600E-01 kg]		8.1772E+01	2.2100E+00	
		540.0000	18.2700													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification
90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0041
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.6960E-03	2.0800E-04
Am-243	5.2170E-02	1.4100E-03
H-3	5.4390E+01	1.4700E+00
K-40	2.0905E+01	5.6500E-01
Pu-238	3.0377E-03	8.2100E-05
Pu-239	6.4380E-02	1.7400E-03
Pu-240	1.4837E-02	4.0100E-04
Pu-241	4.4030E-01	1.1900E-02
Pu-242	1.7538E-06	4.7400E-08
Th-232	2.0461E+00	5.5300E-02
U-Nat	3.8480E+00	1.0400E-01

Bin Number: DB966

975

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ====>

EPA MANIFEST NUMBER: 005885078 JJX

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000018

SHIPMENT NUMBER: 9063-11-0040

CONTACT: Rich Loden

TELEPHONE NUMBER (Include Area Code): (925) 423-1935

6. CARRIER – Name and Address
Phillip West Industrial Services
1902 Shelton Drive
Hollister, CA 95023

EPA I.D. NUMBER: CAR000177827

SHIPPING DATE: 12/22/10

CONTACT: DISPATCH

TELEPHONE (Include Area Code): 800-321-1030

SIGNATURE – Authorized carrier acknowledging waste receipt

DATE: 12-22-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0040

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: M11561

DATE: 12/27/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: TITLE: Shipping Coordinator DATE: 12/22/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 Cfl)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	8.0663E+01	2.1801E+00	NA	27980 LBS; 540 FT3	Q00250797

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
X No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility licenses.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if the shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	15.2911	kg	10768.7372	NP	NP	2.9147E-05	2.9147E-05
	ft3	540.0000	ton	11.8705			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0040

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250797/CA2890012584	2	15.2911	12691.5154	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	1.90000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	13.9900	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	1.29000E-01	5.1430E-02	1.3900E-03	
												H-3	1.35000E+02	5.3650E+01	1.4500E+00	
												K-40	5.18000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	7.52000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.59000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.67000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.08000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.34000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	5.07000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	9.52000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		15.2911	12691.5154									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		540.0000	13.9900									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0040
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: DB942

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4208, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number >>>>>

EPA MANIFEST NUMBER: 005865079 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-755)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0039

CONTACT: Rich Loden

6. CARRIER – Name and Address: Triad Transport Inc
~~Phillip West Industrial Services 1063 Shelton Drive Hollister, CA 95023~~
1630 Dibsel Ave
McAlester, OK 74501

CONTACT: DISPATCH

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: OKD 985588 791
~~CAR000177657~~

SHIPPING DATE: 1/6/11

TELEPHONE (Include Area Code): 800 364 1139
~~800-661-4630~~

DATE: 01-06-11

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0039

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: M11596

DATE: 1-10-11

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 1/6/11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. USA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 Ci6)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0726E+01	2.1818E+00	NA	28380 LBS; 540 FT3	Q00250798 DB 942
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911	kg 10042.9893	NP	NP	2.9147E-05	2.9147E-05
	ft3 540.0000	ton 11.0705			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)
MBq	8.0726E+01	5.3650E+01	NP	NP	NP	(kg) 6.3700E-01
mCi	2.1818E+00	1.4500E+00	NP	NP	NP	(tons) 7.0217E-04

2. MANIFEST NUMBER 9063-11-0039

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250798/CA2890012584	2	15.2911	11965.7675	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	2.04000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	13.1900	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	1.39000E-01	5.1430E-02	1.3900E-03	
												H-3	1.45000E+02	5.3650E+01	1.4500E+00	
												K-40	5.55000E+01	2.0672E+01	5.5870E-01	
												Pu-238 [4.6700E-09 g]	8.06000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.71000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.94000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.16000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.66000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	5.43000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	1.02000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0726E+01	2.1818E+00	
												Total		8.0726E+01	2.1818E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		15.2911	11965.7675									SNM [2.9147E-05 g]		8.0726E+01	2.1818E+00	
		540.0000	13.1900									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0039
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0672E+01	5.5870E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: DB507

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number >>>>>>

EPA MANIFEST NUMBER: 005845060 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-796)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000018

SHIPMENT NUMBER: 9063-11-0038

CONTACT: Rich Loden

6. CARRIER – Name and Address: ~~Philip West Industrial Services, 1800 Shelton Drive, Hollister, CA 95023~~ TRIAD TRANSPORT INC 1630 DIESEL AVE McAlester OK 74501

CONTACT: DISPATCH

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1928

EPA I.D. NUMBER: OKD ~~CAR000087468~~ 981558776

SHIPPING DATE: 1/4/11

TELEPHONE (Include Area Code): ~~800-381-4000~~ 364-1139

DATE: 01-04-11

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0038

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11588

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0165

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE: 1/5/11

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 1-4-11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	30300 LBS; 540 FT3	Q00250799
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-05)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911 ft3 540.0000	kg 11821.0715 ton 13.0305	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0038

3. PAGE 1 **OF** 1 **PAGE(S)**

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250799/CA2890012584	2	15.2911	13743.8497	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	1.73000E-02	7.5850E-03	2.0500E-04	AU
												Am-243	1.18000E-01	5.1430E-02	1.3900E-03	
												H-3	1.23000E+02	5.3650E+01	1.4500E+00	
		540.0000	15.1500	1.0000E-01	0.0000E+00	NP		540.0000				K-40	4.72000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.85000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.45000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.35000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.88000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.96000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.62000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.67000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		15.2911	13743.8497									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		540.0000	15.1500									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0038
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: GFLU2102

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ====> EPA MANIFEST NUMBER: 005855073 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000016
SHIPMENT NUMBER: 9063-11-0037

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013088
SHIPPING DATE: 12-17-10

CONTACT:
TELEPHONE (Include Area Code): 888-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt: Michael Hunter
DATE: 12-17-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0037

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11537

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt:
DATE: 12/20/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: TITLE: Shipping Coordinator DATE: 12-17-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	32880 LBS; 540 FT3	Q00250805
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
___ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911	kg 12991.3399	NP	NP	2.9147E-05	2.9147E-05
	ft3 540.0000	ton 14.3205			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0037

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (F > 0.1%)	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250805/CA2890012584	2	15.2911	14914.1181	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	1.58000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	16.4400	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	1.07000E-01	5.1430E-02	1.3900E-03	
												H-3	1.12000E+02	5.3650E+01	1.4500E+00	
												K-40	4.29000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.23000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.32000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.04000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.99000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.60000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.20000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.89000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
Shipment Totals		15.2911	14914.1181									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	
		540.0000	16.4400													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification
90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0037
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865073 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC — U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0135
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	32880	P	352 / F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0037, Ship Doc # L-143814, Container # Q00250805, Bin # GFLU2102
EMERGENCY CONTACT 925-423-4205, CONTACT NAME LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL — Signature: Richard B Loden — Month 12 Day 17 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter — Signature: Michael Hunter — Month 12 Day 17 Year 10
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

GFLU2101

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 925-423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==> 005865076 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory
7000 East Ave
L-788
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0038
CONTACT: Scott A. Graham

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Road
Suite B
Oak Ridge, Tn 37830

CONTACT: Dispatch

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G
TELEPHONE NUMBER (Include Area Code): 925-422-1825
EPA I.D. NUMBER: NMR000013006
SHIPPING DATE: 12-17-10
TELEPHONE (Include Area Code): 865-482-3896
DATE: 12-17-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER: 9063-11-0038
(Use this number on all continuation pages)

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11534

SIGNATURE – Authorized consignee acknowledging waste receipt

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
DATE: 12-20-10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: TITLE: Shipping Coordinator DATE: 12-17-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous waste, solid, n.o.s.(F001, F002), 9, III (ERG171) (01 CM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	35660 LBS; 540 FT3	Q00250807
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ✗ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911 ft3 540.0000	kg 14252.3268 ton 15.7105	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0036

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OF STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
												RADIONUCLIDES	pCi/gm	MBq	mCi	
Q00250807/0110000015	2	15.2911	16175.1050	1.0000E-03	0.0000E+00	0.0000E+00	29-H	15.2911	100 100	oxide/NP	NP	Am-241	1.44000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	17.8300	1.0000E-01	0.0000E+00	0.0000E+00		540.0000				Am-243	9.77000E-02	5.1430E-02	1.3900E-03	
												H-3	1.02000E+02	5.3650E+01	1.4500E+00	
												K-40	3.91000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	5.68000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.20000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	2.77000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.20000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.28000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	3.83000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.19000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
Shipment Totals		15.2911	16175.1050									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	
		540.0000	17.8300													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural overpacks the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0036
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865076 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1825 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC — U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155 — U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	35660	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0036, Ship Doc No. L-143811. Container # Q00250807, Bin # GFLU2101.
Contact Name: LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Graham on behalf of LLNL — Signature: [signature] — Month 12 Day 17 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Wanda Taylor — Signature: [signature] — Month 12 Day 17 Year 10
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: DB506

100

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4203, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number: ~~005865063 JJK~~ 768 12-27-10 005865101 JJK

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY: Lawrence Livermore National Laboratory for the US DOE, 7000 East Avenue (L-768), Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR ☐ PROCESSOR ☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000018
SHIPMENT NUMBER: 9063-11-0034

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address: Philip West Industrial Services, 1802 Shelton Drive, Hollister, CA 95023
EPA I.D. NUMBER: CAR000177527
SHIPPING DATE: 12/27/2010

CONTACT
TELEPHONE (Include Area Code): 800-321-1030

SIGNATURE – Authorized carrier acknowledging waste receipt: Bernard Aymon
DATE: 12-27-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S); FORM 541 AND 541A — 1 PAGE(S); FORM 542 AND 542A — None PAGE(S); ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0034

9. CONSIGNEE - Name and Facility: EnergySolutions, LLC, Clive Disposal Site (Bulk Waste Facility), Interstate 80, Exit 49, Clive, UT 84029
M11567

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt:
DATE: 12/28/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: | TITLE: Shipping Coordinator | DATE: 12-27-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0563E+01	2.1801E+00	NA	26640 LBS; 540 FT3	Q00250800
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST.) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911 ft3 540.0000	kg 10160.9234 ton 11.2005	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0034

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250800/CA2890012584	2	15.2911	12083.7015	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	2.02000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	13.3200	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	1.37000E-01	5.1430E-02	1.3900E-03	
												H-3	1.43000E+02	5.3650E+01	1.4500E+00	
												K-40	5.49000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	7.97000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.69000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.89000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.15000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.60000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	5.37000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	1.01000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
Shipment Totals		15.2911	12083.7015									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	
		540.0000	13.3200													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0034
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: DB1298

2359

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005255031 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015

SHIPMENT NUMBER: 9083-11-0033

CONTACT: Rich Loden

6. CARRIER – Name and Address
~~Philip Services Industrial Services 1999 Shelton Drive Hollister, CA 95023~~
Discovery Solutions LLC
111 Union Valley Road Suite B
OAK RIDGE, TN 37830

CONTACT: DISPATCH

SIGNATURE – Authorized carrier acknowledging waste receipt: Kelly J. Taylor

SHIPPER ID. NUMBER: CA2890012564
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: ~~CAD008347583~~ NVT330010086

SHIPPING DATE: 12/27/10

TELEPHONE (Include Area Code): 800-321-1030

DATE: 12/27/2010

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9083-11-0033

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11559

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]

DATE: 12/28/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/27/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 Cifi)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	31900 LBS; 540 FT3	Q00250801
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	15.2911	kg	12546.8194	NP	NP	2.9147E-05	2.9147E-05
	ft3	540.0000	ton	13.8305			1 Container	

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0033

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250801/CA2890012584	2	15.2911	14469.5976	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100	Oxide/NP	NP	Am-241	1.63000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	15.9500	1.0000E-01	0.0000E+00	NP		540.0000	100			Am-243	1.11000E-01	5.1430E-02	1.3900E-03	
												H-3	1.16000E+02	5.3650E+01	1.4500E+00	
												K-40	4.44000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.45000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.37000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.15000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.31000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.73000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.35000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.17000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		15.2911	14469.5976									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		540.0000	15.9500									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0033
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865081 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Philip West Industrial Services — U.S. EPA ID Number: CAR000177527

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	31900	P	352	F002	
						F001	F005	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0033, Ship Doc # L-143878, Container # Q00250801, Bin # DB1298

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL — Signature: Richard B Loden — Month 12 Day 27 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: KELLY LT TAYLOR — Signature: Kelly L Taylor — Month 12 Day 27 Year 2010
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU2104

114

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>> EPA MANIFEST NUMBER: 005685096 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000018
SHIPMENT NUMBER: 9063-11-0032

CONTACT: Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT: Dispatch

SIGNATURE – Authorized carrier acknowledging waste receipt: Michael Hunter

SHIPPER I.D. NUMBER: CA2890012564
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): Q

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: NMR000013086

SHIPPING DATE: 12/27/10

TELEPHONE (Include Area Code): 865-482-3896

DATE: 12-27-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0032

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11560

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]
DATE: 12/28/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/27/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0963E+01	2.1501E+00	NA	35440 LBS; 540 FT3	Q00250809
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911	kg 14152.5365	NP	NP	2.9147E-05	2.9147E-05
	ft3 540.0000	ton 15.6005			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0032

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250809/CA2890012584	2	15.2911	16075.3147	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100	Oxide/NP	NP	Am-241	1.45000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	17.7200	1.0000E-01	0.0000E+00	NP		540.0000	100			Am-243	9.84000E-02	5.1430E-02	1.3900E-03	
												H-3	1.03000E+02	5.3650E+01	1.4500E+00	
												K-40	3.94000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	5.72000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.21000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	2.79000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.25000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.30000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	3.86000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.24000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		15.2911	16075.3147									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		540.0000	17.7200									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0032
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865096 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	35440	P	352	F002	
						F001	F005	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0032, Ship Doc # I-143970, Container # Q00250809, Bin # GFLU2104
EMERGENCY CONTACT 925-423-4205, CONTACT NAME LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 27 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 12 Day 27 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU2103

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ======> EPA MANIFEST NUMBER: 005865094 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR ☐ PROCESSOR ☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0031

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address: VISIONARY ~~Phillip West Industrial Services~~ Solutions, LLC ~~1803 Shelton Drive Hollister, CA 95023~~ 111 Union Valley Road Suite B Oakridge, TN 37830
EPA I.D. NUMBER: N/A ~~CAR000127537~~ 000038816
SHIPPING DATE: 1/6/11
CONTACT: DISPATCH
TELEPHONE (Include Area Code): 865 482 3896 ~~800-621-4030~~
SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 1-6-11

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S); FORM 541 AND 541A — 1 PAGE(S); FORM 542 AND 542A — None PAGE(S); ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0031

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.
AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 1/6/11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	36140 LBS; 540 FT3	Q00250808
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911	kg 14470.0512	NP	NP	2.9147E-05	2.9147E-05
	ft3 540.0000	ton 15.9505			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0031

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250808/CA2890012584	2	15.2911	16392.8293	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	1.42000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	18.0700	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	9.63000E-02	5.1430E-02	1.3900E-03	
												H-3	1.00000E+02	5.3650E+01	1.4500E+00	
												K-40	3.85000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	5.59000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.18000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	2.73000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.07000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.23000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	3.77000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.08000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		15.2911	16392.8293									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		540.0000	18.0700									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0031
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865094 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: ~~Phillips West Industrial Services~~ Visionary Solutions, LLC
U.S. EPA ID Number: NMR000013086 ~~CAR000177527~~

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	36140	P	352 / F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0031, Ship Doc # L-143984, Container # Q00250808, Bin # GFLU2103
EMERGENCY CONTACT 925-423-4205, CONTACT NAME LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 1 Day 6 Year 11

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Wade Taylor
Signature:
Month 1 Day 6 Year 11
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU2108

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4203, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number >>>>>>

EPA MANIFEST NUMBER: 005655090 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000018
SHIPMENT NUMBER: 9063-11-0030

CONTACT: Rich Loden

6. CARRIER – Name and Address: ~~Phillip West Industrial Services, 1662 Shelton Drive, Hollister, CA 95023~~ Trial Transport LLC, 1630 Diesel Ave, McAlester, OK 74501

CONTACT: DISPATCH

SIGNATURE – Authorized carrier acknowledging waste receipt: Martin Zinch

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: OKD 981588741

SHIPPING DATE

TELEPHONE (Include Area Code): 800 364 1139

DATE: 1-6-11

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0030

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
MU597

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE: 1-10-11

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 1/6/11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 cm)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	19860 LBS; 540 FT3	Q00250806
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ___ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911 ft3 540.0000	kg 7085.5669 ton 7.8105	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0030

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250806/CA2890012584	2	15.2911	9008.3451	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	2.89000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	9.9300	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	1.97000E-01	5.1430E-02	1.3900E-03	
												H-3	2.05000E+02	5.3650E+01	1.4500E+00	
												K-40	7.87000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	1.14000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	2.42000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	5.58000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.65000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	6.60000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	7.70000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	1.45000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		15.2911	9008.3451									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		540.0000	9.9300									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0030
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: BKRU025649

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865060 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER
CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-11-0029

CONTACT
Rich Loden

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE
12-16-10

CONTACT

TELEPHONE (Include Area Code)
865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
Michael Hunt

DATE
12-16-10

7. FORM 540 AND 540A PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A 1 PAGE(S)
FORM 542 AND 542A None PAGE(S)
ADDITIONAL INFORMATION None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-11-0029

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE
TITLE Shipping Coordinator
DATE 12/16/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	35220 LBS; 678 FT3	Q00250795
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	12701.0408	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	14.0005			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0029

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250795/CA2890012584	2	19.1988	15975.5243	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.61000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	17.6100	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.10000E-01	5.1430E-02	1.3900E-03	
												H-3	1.14000E+02	5.3650E+01	1.4500E+00	
												K-40	4.39000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.37000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.35000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.11000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.20000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.68000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.30000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.07000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
Shipment Totals		19.1988	15975.5243									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	
		678.0000	17.6100													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0029
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865060 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	35220	P	352	F002	
						F001	F005	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load #9063-11-0029, Ship Doc #L-143730, Container #Q00250795, Bin #BKRU025649
EMERGENCY CONTACT 925-423-4205, CONTACT NAME LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 16 Year 10

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 12 Day 16 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: DB979

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4208, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>> 006886283 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR ☐ PROCESSOR ☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0028

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address: Triad Transport INC 1630 DIESEL AVE McAlester, OK 74502
EPA I.D. NUMBER: OKD
SHIPPING DATE: 1-4-11
CONTACT: DISPATCH
TELEPHONE (Include Area Code): 800-[illegible] 361-1139
SIGNATURE – Authorized carrier acknowledging waste receipt: Paul [illegible]
DATE: 01-04-11

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0028

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11589
CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt: [illegible]
DATE: 1/5/11

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.
AUTHORIZED SIGNATURE: [illegible]
TITLE: Shipping Coordinator
DATE: 1-4-11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	31460 LBS; 640 FT3	Q00250802
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 15.2911 ft3 540.0000	kg 12347.2387 ton 13.6105	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0028

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250802/CA2890012584	2	15.2911	14270.0169	1.0000E-03	0.0000E+00	NP	29-H	15.2911	100 100	Oxide/NP	NP	Am-241	1.66000E-02	7.5850E-03	2.0500E-04	AU
		540.0000	15.7300	1.0000E-01	0.0000E+00	NP		540.0000				Am-243	1.13000E-01	5.1430E-02	1.3900E-03	
												H-3	1.18000E+02	5.3650E+01	1.4500E+00	
												K-40	4.51000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.56000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.39000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.20000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.46000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.79000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.42000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.30000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		15.2911	14270.0169									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		540.0000	15.7300									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0028
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: GFLU001111

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4208, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO — If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005865062 JJK

5. SHIPPER – NAME AND FACILITY: Lawrence Livermore National Laboratory for the US DOE, 7000 East Avenue (L-758), Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000016

SHIPMENT NUMBER: 9063-11-0027

CONTACT: Rich Loden

6. CARRIER – Name and Address: Phillip West Industrial Services, 1802 Shelton Drive, Hollister, CA 95023

CONTACT: DISPATCH

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR ☐ PROCESSOR ☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1928

EPA I.D. NUMBER: CAR000177627

SHIPPING DATE: 12/16/10

TELEPHONE (Include Area Code): 800-321-1030

DATE: 12-16-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S); FORM 541 AND 541A — 1 PAGE(S); FORM 542 AND 542A — None PAGE(S); ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0027

9. CONSIGNEE - Name and Facility: EnergySolutions, LLC, Clive Disposal Site (Bulk Waste Facility), Interstate 80, Exit 49, Clive, UT 84029

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: M11582

DATE: 12-29-10

10. CERTIFICATION: This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/16/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0563E+01	2.1801E+00	NA	31760 LBS; 678 FT3	Q00249435
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS — BO 12-29-10

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ✗ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-05)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 10714.3061 ton 11.8105	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0027

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249435/CA2890012584	2	19.1988	14406.0946	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.91000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	15.8800	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.30000E-01	5.1430E-02	1.3900E-03	
												H-3	1.36000E+02	5.3650E+01	1.4500E+00	
												K-40	5.20000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	7.56000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.60000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.69000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.09000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.36000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	5.09000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	9.57000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
Shipment Totals		19.1988	14406.0946									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	
		678.0000	15.8800													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0027
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: GFLU001028

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====> EPA MANIFEST NUMBER: 005865059 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0026

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12/16/10

CONTACT:
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt: Michael Hunter
DATE: 12-16-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0026

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt:
DATE:

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/16/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	8.0663E+01	2.1801E+00	NA	35260 LBS; 678 FT3	Q00249434

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT
1	m3 19.1988 ft3 678.0000	kg 12329.0950 ton 13.5905

SPECIAL NUCLEAR MATERIAL (grams)

U-233	U-235	Pu	Total
NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0026

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249434/CA2890012584	2	19.1988	15993.6680	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.66000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	17.6300	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.13000E-01	5.1430E-02	1.3900E-03	
												H-3	1.18000E+02	5.3650E+01	1.4500E+00	
												K-40	4.52000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.57000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.39000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.21000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.47000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.79000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.43000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.31000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	15993.6680									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	17.6300									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0026
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865059 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	35260	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load #9063-11-0026, Ship Doc #L-143717, Container #Q00249434, Bin #GFLU001028
EMERGENCY NOTIFICATION 925-423-4205, CONTACT NAME LLNL EMERGENCY DISPATCH.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 16 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 12 Day 16 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU001173

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number >>>>> 005888083 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000018
SHIPMENT NUMBER: 9083-11-0025
CONTACT: Rich Loden

6. CARRIER – Name and Address
Philip West Industrial Services
1802 Shelton Drive
Hollister, CA 95023

CONTACT: DISPATCH
SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G
TELEPHONE NUMBER (Include Area Code): (925) 423-1925
EPA I.D. NUMBER: CAR000177627
SHIPPING DATE: 12-16-10
TELEPHONE (Include Area Code): 800-321-1036
DATE: 12-16-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9083-11-0025

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M 1575

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]
DATE: 12-28-10

9A. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-16-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	33580 LBS; 678 FT3	Q00249437
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ___ is (or) X is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1. BD 12/28/10

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	11485.4132	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	12.6605			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0025

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249437/CA2890012584	2	19.1988	15231.6328	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.78000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	16.7900	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.21000E-01	5.1430E-02	1.3900E-03	
												H-3	1.26000E+02	5.3650E+01	1.4500E+00	
												K-40	4.85000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	7.05000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.49000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.44000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.02000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.07000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.75000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.92000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	15231.6328									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	16.7900									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0025
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: CVGU001183

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005285069 JJX

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-793)
Livermore, CA 94550

Utah Generator Site Access Permit No: 0110000018

SHIPMENT NUMBER: 9063-11-0024

CONTACT: Rich Loden

6. CARRIER – Name and Address
Phillip West Industrial Services
1822 Shelton Drive
Hollister, CA 95023

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 423-1925

EPA I.D. NUMBER: CAR000177627

SHIPPING DATE: 12/16/10

TELEPHONE (Include Area Code): 800-321-1030

DATE: 12-16-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

SIGNATURE – Authorized consignee acknowledging waste receipt: MUS85

9. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0024

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

DATE: 12-29-10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] — TITLE: Shipping Coordinator — DATE: 12/16/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	8.0663E+01	2.1801E+00	NA	32160 LBS; 678 FT3	Q00249436

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

BD 12-29-10

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material is (or) ☒ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 10805.0246 ton 11.9105	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0024

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249436/CA2890012584	2	19.1988	14587.5316	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.90000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	16.0800	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.29000E-01	5.1430E-02	1.3900E-03	
												H-3	1.34000E+02	5.3650E+01	1.4500E+00	
												K-40	5.16000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	7.49000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.59000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.66000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.08000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.33000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	5.05000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	9.49000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	14587.5316									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	16.0800									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0024
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Bin Number: BKRU026009

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ==== > 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ====> EPA MANIFEST NUMBER: 005865054 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-756)
Livermore, CA 94550

Utah Generator Site Access Permit No. 0110000015
SHIPMENT NUMBER 9063-11-0023
CONTACT: Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830
CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G
TELEPHONE NUMBER (Include Area Code): (925) 422-1925
EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-15-10
TELEPHONE (Include Area Code): 865-482-3896
DATE: 12-15-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0023

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-15-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	37840 LBS; 678 FT3	Q00249438
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 13844.0936 ton 15.2605	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg) 6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons) 7.0217E-04

2. MANIFEST NUMBER 9063-11-0023

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249438/CA2890012584	2	19.1988	17163.9364	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.48000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	18.9200	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.01000E-01	5.1430E-02	1.3900E-03	
												H-3	1.05000E+02	5.3650E+01	1.4500E+00	
												K-40	4.03000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	5.85000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.24000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	2.86000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.44000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.38000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	3.94000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.40000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	17163.9364									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	18.9200									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0023
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865054 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	37840	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load Number 9063-11-0023, Ship Doc # L-143667, Container # Q00249438, Bin # BKRU026009

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 15 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 12 Day 15 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

GENERATOR

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU01467

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number: 005885056 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000018
SHIPMENT NUMBER: 9063-11-0022
CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR ☐ PROCESSOR ☑ GENERATOR TYPE (Specify): G

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830
CONTACT:
SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]
EPA I.D. NUMBER: NMR000013088
SHIPPING DATE: 12-15-10
TELEPHONE (Include Area Code): 865-482-3898
DATE: 12-15-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0022

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11574
CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]
DATE: 12/28/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.
AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-15-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0683E+01	2.1801E+00	NA	38880 LBS; 678 FT3	Q00249439
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS
A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ___ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.
B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC
C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.
D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 14315.8297 ton 15.7805	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0022

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249439/CA2890012584	2	19.1988	17635.6725	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.43000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	19.4400	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	9.73000E-02	5.1430E-02	1.3900E-03	
												H-3	1.01000E+02	5.3650E+01	1.4500E+00	
												K-40	3.89000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	5.65000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.20000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	2.76000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.16000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.27000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	3.81000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.16000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	17635.6725									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	19.4400									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0022
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865056 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	38880	P	352	F002	
						F001	F005	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0022, Ship Doc # L-143682, Container # Q00249439, Bin # GFLU01467
EMERGENCY CONTACT 925-423-4205, CONTACT NAME LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 15 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 12 Day 15 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: BKRU025593

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====> EPA MANIFEST NUMBER: 005865053 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0021

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-15-10
CONTACT
TELEPHONE (Include Area Code): 865-482-3896
SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 12-15-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0021

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-15-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	37320 LBS; 678 FT3	Q00249441
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988	kg 13608.2256	NP	NP	2.9147E-05	2.9147E-05
	ft3 678.0000	ton 15.0005			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0021

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249441/CA2890012584	2	19.1988	16928.0684	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.50000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	18.6600	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.02000E-01	5.1430E-02	1.3900E-03	
												H-3	1.07000E+02	5.3650E+01	1.4500E+00	
												K-40	4.10000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	5.95000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.26000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	2.91000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.58000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.44000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.01000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.53000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
Shipment Totals		19.1988	16928.0684									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	
		678.0000	18.6600													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0021
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of: 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865053 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	37320	P	332	F002	
						F001	F005	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0021, Ship Doc # L-143656, Container # Q00249441, Bin # BKRU025593
~~This is an exclusive use shipment.~~

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 15 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 12 Day 15 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin # BKRU026150

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 925-423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005865058 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory
7000 East Ave
L-786
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015

SHIPMENT NUMBER: 9063-11-0020

CONTACT: Scott A. Graham

TELEPHONE NUMBER (Include Area Code): 925-422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Road
Suite B
Oak Ridge, Tn 37830

EPA I.D. NUMBER: NUR000013088

SHIPPING DATE: 12/16/10

CONTACT: Dispatch

TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]

DATE: 12-16-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0020

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11579

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]

DATE: 12-28-10

CERTIFICATION

This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/16/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III (ERG171) (01 CM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	36000 LBS; 678 FT3	Q00249440
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ___ is (or) X is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT
1	m3 19.1988	kg 12964.1244
	ft3 678.0000	ton 14.2905

SPECIAL NUCLEAR MATERIAL (grams)

U-233	U-235	Pu	Total
NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0020

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249440/0110000015	2	19.1988	16329.3264	1.0000E-03	0.0000E+00	0.0000E+00	29-H	19.1988	100 100	oxide/NP	NP	Am-241	1.58000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	18.0000	1.0000E-01	0.0000E+00	0.0000E+00		678.0000				Am-243	1.07000E-01	5.1430E-02	1.3900E-03	
												H-3	1.12000E+02	5.3650E+01	1.4500E+00	
												K-40	4.30000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.24000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.32000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.05000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.01000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.61000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.21000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.91000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	16329.3264									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	18.0000									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0020
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865058 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-766
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	36000	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0020, Ship Doc No. L-143695, Container # Q00249440, Bin # BKRU026150.
Emergency Contact 925-423-4205 Contact Name: LLNL Emergency Dispatch

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Graham on behalf of LLNL
Signature: [signature]
Month 12 Day 16 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: [signature]
Month 12 Day 16 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin # 25634

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 925-423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005865081 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory
7000 East Ave
L-788
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0019
CONTACT: Scott A. Graham
TELEPHONE NUMBER (Include Area Code): 925-422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Road
Suite B
Oak Ridge, Tn 37830

EPA I.D. NUMBER: NMR000013086
CONTACT: Dispatch
TELEPHONE (Include Area Code): 865-482-3826
SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]
DATE: 12-16-10

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G
SHIPPING DATE: 12/16/10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0019

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11571

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]
DATE: 12-28-10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] — TITLE: Shipping Coordinator — DATE: 12/16/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III (ERG171) (01 CM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	39380 LBS; 678 FT3	Q00250794
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ✗ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988	kg 14479.1230	NP	NP	2.9147E-05	2.9147E-05
	ft3 678.0000	ton 15.9605			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0019

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00250794/0110000015	2	19.1988	17862.4687	1.0000E-03	0.0000E+00	0.0000E+00	29-H	19.1988	100	oxide/NP	NP	Am-241	1.41000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	19.6900	1.0000E-01	0.0000E+00	0.0000E+00		678.0000	100			Am-243	9.62000E-02	5.1430E-02	1.3900E-03	
												H-3	1.00000E+02	5.3650E+01	1.4500E+00	
												K-40	3.85000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	5.59000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.18000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	2.73000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.07000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.23000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	3.77000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.08000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	17862.4687									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	19.6900									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0019
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Contact NAME:
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865061 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1923 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	39380	P	332 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0019, Ship Doc No. L-143699. Container # Q00250794, Bin # 25634.
~~This is an exclusive Use Shipment.~~

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Graham on behalf of LLNL
Signature:
Month 12 Day 16 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Waco Taylor
Signature:
Month 12 Day 16 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU001008

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER: 005865049 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0018

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-14-10

CONTACT:
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 12-14-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0018

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE:

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: Scott A
TITLE: Shipping Coordinator
DATE: 12-14-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 cm)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	8.0663E+01	2.1801E+00	NA	37620 LBS; 678 FT3	Q00249418

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT
1	m3 19.1988 ft3 678.0000	kg 13345.1420 ton 14.7105

SPECIAL NUCLEAR MATERIAL (grams)

U-233	U-235	Pu	Total
NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0018

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249418/CA2890012584	2	19.1988	17064.1461	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.53000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	18.8100	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.04000E-01	5.1430E-02	1.3900E-03	
												H-3	1.09000E+02	5.3650E+01	1.4500E+00	
												K-40	4.18000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.07000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.28000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	2.96000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	8.75000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.50000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.09000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	7.68000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	17064.1461									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	18.8100									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0018
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865049 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC — U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	37620	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0018, Ship Doc # L-143618, Container # Q00249418, Bin # GFLU001008
EMERGENCY CONTACT 925-423-4205, CONTACT NAME LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL — Signature: Richard B Loden — Month 12 Day 14 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Hunter — Signature: Michael Hunter — Month 12 Day 14 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: BKRU025575

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865047 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0017

CONTACT: Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: NMR000013086

SHIPPING DATE: 12-14-10

TELEPHONE (Include Area Code): 865-482-3896

DATE: 12-14-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0017

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-14-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	34700 LBS; 678 FT3	Q00249421
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 12419.8135 ton 13.6905	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0017

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249421/CA2890012584	2	19.1988	15739.6563	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.65000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	17.3500	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.12000E-01	5.1430E-02	1.3900E-03	
												H-3	1.17000E+02	5.3650E+01	1.4500E+00	
												K-40	4.49000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.52000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.38000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.18000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.40000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.76000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.39000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.25000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
Shipment Totals		19.1988	15739.6563									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	
		678.0000	17.3500													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0017
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865047 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	34700	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0017, Ship Doc # L-143623, Container # Q00249421. Bin # BKRU255750
EMERGENCY CONTACT: 925-423-4205, CONTACT NAME: LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 14 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Transporter signature (for exports only):
Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Waco Taylor
Signature
Month 12 Day 14 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: CVGU0091192

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☑ YES
☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ==== 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ====>

EPA MANIFEST NUMBER
005865042 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-11-0016

CONTACT
Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER
CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE
12/13/10

TELEPHONE (Include Area Code)
865-482-3896

DATE
12-13-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-11-0016

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: Richard B Loden
TITLE: SHIPPING COORDINATOR
DATE: 12-13-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162), Fissile Excepted (1 CM)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	8.0700E+01	2.1811E+00	LSA-II	17720 LBS; 678 FT3	Q00249406

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	4182.5755	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	4.6105			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0016

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249406/CA2890012584	2	19.1988	8037.6573	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	4.87000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	8.8600	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	3.31000E-01	5.1430E-02	1.3900E-03	
												H-3	3.45000E+02	5.3650E+01	1.4500E+00	
												K-40	1.33000E+02	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	1.92000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	4.07000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	9.40000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.78000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.11000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.30000E+01	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	2.44000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	8037.6573									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	8.8600									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0016
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

GENERATOR

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	CA2890012584	1	925-423-4205	005865042 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC — U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-11)	1	CM	17720	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0016, Ship Doc # L-143587, Container Number Q00249406.
EXCLUSIVE USE SHIPMENT

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: RICHARD B LODEN ON BEHALF OF LLNL — Signature: Richard B Loden — Month 12 Day 13 Year 10

INTL

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Wes Taylor — Signature: [signature] — Month 12 Day 13 Year 10
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU001051

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☑ YES
☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865045 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER
CA2890012584
☐ COLLECTOR
☐ PROCESSOR

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-11-0015

☑ GENERATOR TYPE (Specify) G

CONTACT
Rich Loden

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE 12-13-10

CONTACT

TELEPHONE (Include Area Code)
865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt

DATE 12-13-10

7. FORM 540 AND 540A PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A 1 PAGE(S)
FORM 542 AND 542A None PAGE(S)
ADDITIONAL INFORMATION None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-11-0015

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE [signature] TITLE Shipping Coordinator DATE 12/13/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	LSA-II	16,260 LBS; 678 FT3	Q00249405
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	3701.7676	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	4.0805			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0015

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249405/CA2890012584	2	19.1988	7375.4124	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	5.53000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	8.1300	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	3.76000E-01	5.1430E-02	1.3900E-03	
												H-3	3.92000E+02	5.3650E+01	1.4500E+00	
												K-40	1.51000E+02	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	2.19000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	4.63000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	1.07000E-01	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	3.16000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.26000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.47000E+01	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	2.77000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	7375.4124									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	8.1300									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0015
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865045 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-11)	1	CM	16260	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for the DOT shipping paper.
Load # 9063-11-0015, Ship Doc # L-143590, Container # Q00249405.
This is an exclusive use shipment.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Graham on behalf of LLNL
Signature:
Month 12 Day 13 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Waco Taylor
Signature:
Month 12 Day 13 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: BKRU026232

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====> EPA MANIFEST NUMBER: 005865040 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0014

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-13-10

CONTACT:
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt: Michael Hunter
DATE: 12-13-2010

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0014

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt:
DATE:

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/13/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	8.0663E+01	2.1801E+00	NA	33540 LBS; 678 FT3	Q00249419

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 / ft3 678.0000	kg 11920.8619 / ton 13.1405	NP	NP	2.9147E-05 / 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0014

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
0902498 CA2890012584	2	19.1988	15213.4891	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.72000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	16.7700	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.17000E-01	5.1430E-02	1.3900E-03	
												H-3	1.22000E+02	5.3650E+01	1.4500E+00	
												K-40	4.68000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	6.79000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.44000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.32000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.80000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.92000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.58000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	8.60000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	15213.4891									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	16.7700									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural overpacks the numerical code must be followed by "-OR."

1. Wooden Box/Crate
2. Metal Box
3. Plastic Drum/Pail
4. Metal Drum/Pail
5. Metal Tank/Liner
6. Concrete Tank Liner
7. Polyethylene Tank Liner
8. Fiberglass Tank Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0014
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865040 JJK

5. Generator's Name and Mailing Address:
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-~~18~~ 11) ~~132~~	1	CM	33540	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0014, Ship Doc # L-143585, Container # Q00249419
EMERGENCY CONTACT (925) 423-4205, CONTACT NAME: LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Kimberly Fugmann on behalf of LLNL
Signature: [signature] 12-13-10
Month 12 Day 13 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: [signature]
Month 12 Day 13 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

GENERATOR INT'L TRANSPORTER DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: MHFU001131

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865044 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER
CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-11-0013

CONTACT
Rich Loden

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE
12/13/10

CONTACT

TELEPHONE (Include Area Code)
865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
Michael Hart

DATE
12/13/2010

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-11-0013

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION

This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE — TITLE: Shipping Coordinator — DATE: 12/13/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	30220 LBS; 678 FT3	Q00249420
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988	kg 9925.0553	NP	NP	2.9147E-05	2.9147E-05
	ft3 678.0000	ton 10.9405			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0013

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249420/CA2890012584	2	19.1988	13707.5623	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100	Oxide/NP	NP	Am-241	2.06000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	15.1100	1.0000E-01	0.0000E+00	NP		678.0000	100			Am-243	1.40000E-01	5.1430E-02	1.3900E-03	
												H-3	1.46000E+02	5.3650E+01	1.4500E+00	
												K-40	5.62000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	8.16000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.73000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.98000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.18000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	4.71000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	5.50000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	1.03000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	13707.5623									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	15.1100									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0013
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865044 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-765
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	30220	P	352	F005	
						F001	F002	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPS tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0013, Ship Doc # L-143589, Container # Q00249420.
EMERGENCY CONTACT 925-423-4205 CONTACT NAME: LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A Graham on behalf of LLNL
Signature: [signature]
Month 12 Day 13 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: [signature]
Month 12 Day 13 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU001050

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ==> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005865043 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015

SHIPMENT NUMBER: 9063-11-0012

CONTACT: Rich Loden

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086

SHIPPING DATE: 12/13/10

CONTACT:

TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt: Michael Hunter

DATE: 12/13/2010

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0012

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt:

DATE:

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: Richard L Loden — TITLE: SHIPPING COORDINATOR — DATE: 12-13-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0626E+01	2.1791E+00	NA	34220 LBS; 678 FT3	Q00249416
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 11830.1434 ton 13.0405	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0626E+01	5.3650E+01	NP	NP	NP	(kg)	1.4992E+01
mCi	2.1791E+00	1.4500E+00	NP	NP	NP	(tons)	1.6526E-02

2. MANIFEST NUMBER 9063-11-0012

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249416/CA2890012584	2	19.1988	15521.9319	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	1.73000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	17.1100	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.18000E-01	5.1430E-02	1.3900E-03	
												H-3	1.23000E+02	5.3650E+01	1.4500E+00	
												K-40	4.71000E+01	2.0572E+01	5.5600E-01	
												Pu-238 [4.6700E-09 g]	6.84000E-03	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	1.45000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	3.34000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	9.87000E-01	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	3.95000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	4.61000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E+01 kg]	8.66000E+00	3.8110E+00	1.0300E-01	
												Subtotal		8.0626E+01	2.1791E+00	
												Total		8.0626E+01	2.1791E+00	
												SNM [2.9147E-05 g] Source [1.4992E+01 kg]				
Shipment Totals		19.1988	15521.9319									SNM [2.9147E-05 g] Source [1.4992E+01 kg]		8.0626E+01	2.1791E+00	
		678.0000	17.1100													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0012
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0572E+01	5.5600E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865043 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	34220	P	352 F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0012, Ship Doc # L-143588, Container # Q00249416.
EMERGENCY CONTACT (925)423-4205, CONTACT NAME: LLNL EMERGENCY DISPATCH.

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: RICHARD B LODEN ON BEHALF OF LLNL
Signature: Richard B Loden
Month 12 Day 13 Year 10

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 12 Day 13 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

GTLU 000 374

Bin Number: ~~CFW000374~~ 5C12/10/10

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>
EPA MANIFEST NUMBER
005865032 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No. 0110000015
SHIPMENT NUMBER 9063-11-0011
CONTACT Rich Loden

SHIPPER I.D. NUMBER CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G
TELEPHONE NUMBER (Include Area Code) (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT

EPA I.D. NUMBER NMR000013086
SHIPPING DATE
TELEPHONE (Include Area Code) 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
DATE 12-10-10

7. FORM 540 AND 540A PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A 1 PAGE(S)
FORM 542 AND 542A None PAGE(S)
ADDITIONAL INFORMATION None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-11-0011

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT Transportation Compliance
TELEPHONE (Include Area Code) (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE
TITLE Shipping Coordinator
DATE 12/10/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	24320 LBS; 678 FT3	Q00249410
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	7394.0097	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	8.1505			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0011

3. PAGE 1 **OF** 1 **PAGE(S)**

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q0024941G/CA2890012584	2	19.1988	11031.3672	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	2.77000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	12.1600	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	1.88000E-01	5.1430E-02	1.3900E-03	
												H-3	1.96000E+02	5.3650E+01	1.4500E+00	
												K-40	7.54000E+01	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	1.09000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	2.32000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	5.35000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.58000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	6.32000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	7.38000E+00	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	1.39000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	11031.3672									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	12.1600									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0011
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865032 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-766
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate 80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9083-11)	1	CM	24320	P	352 / F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9083-11-0011, Ship Doc # L-143477., Container # Q00249410, Bin # ~~CFW000374~~ GFLU 000374 5/12/10
EMERGENCY CONTACT (925) 423-4205, CONTACT NAME: LLNL EMERGENCY DISPATCH

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Sean Garvey ~~Richard B Loden~~ on behalf of LLNL
Signature: [signature]
Month 12 Day 10 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Waro Taylor
Signature: [signature]
Month 12 Day 10 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: BFLU000011

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ==== > 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ===== > EPA MANIFEST NUMBER: 005865031 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0010
CONTACT: Rich Loden

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT:
SIGNATURE – Authorized carrier acknowledging waste receipt

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE:
TELEPHONE (Include Area Code): 865-482-3896
DATE: 12-10-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0010

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt
DATE:

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: Joan Harvey
TITLE: Shipping Coordinator
DATE:

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 cm)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	18520 LBS; 678 FT3	Q00249409
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 4717.8146 ton 5.2005	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0010

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249409/CA2890012584	2	19.1988	8400.5312	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	4.34000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	9.2600	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	2.95000E-01	5.1430E-02	1.3900E-03	
												H-3	3.08000E+02	5.3650E+01	1.4500E+00	
												K-40	1.18000E+02	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	1.72000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	3.63000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	8.38000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.48000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	9.91000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.16000E+01	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	2.17000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	8400.5312									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	9.2600									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0010
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865031 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type*	11. Total Quantity	12. Unit Wt/Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	CM	18520	P	332 / F001	/ F002	F005 / ~~F003~~ RA
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-11-0010, Ship Doc No L-143473.
Container # Q00249409, Bin # BFLU000011 EMERGENCY CONTACT (925)423-4205 CONTACT NAME: LLNL Emergency Dispatch

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Sean Garvey ~~Richard B Loden~~ on behalf of LLNL
Signature: [signature]
Month 12 Day 10 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Ward Taylor
Signature: [signature]
Month 12 Day 10 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865030 JJK

GENERATOR

5. Generator's Name and Mailing Address: Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-~~10~~-11) ABX	1	CM	18880	P	352 / F001	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
Load # 9063-11-0009, Ship Doc No L-143442
CONTAINER NUMBER Q00249407
Bin # GFLU001123

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: ~~Richard B Loden~~ SCOTT A GRAHAM on behalf of LLNL
Signature:
Month 12 Day 09 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature:
Month 12 Day 09 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin # GFL400123

FORM 540 — **EnergySolutions, LLC**

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865030 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER
CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-11-0009

CONTACT
Rich Loden

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE
12/9/10

CONTACT

TELEPHONE (Include Area Code)
865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt

DATE
12-9-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-11-0009

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE — TITLE: Shipping Coordinator — DATE: 12/9/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III, (ERG Nr 171) (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	NA	18880 LBS; 678 FT3	Q00249407
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 4844.8204 ton 5.3405	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg) 6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons) 7.0217E-04

2. MANIFEST NUMBER 9063-11-0009

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
												RADIONUCLIDES	pCi/gm	MBq	mCi	
Q00249407/CA2890012584	2	19.1988	8563.8245	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	4.23000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	9.4400	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	2.88000E-01	5.1430E-02	1.3900E-03	
												H-3	3.00000E+02	5.3650E+01	1.4500E+00	
												K-40	1.15000E+02	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	1.67000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	3.54000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	8.16000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.41000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	9.65000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.13000E+01	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	2.12000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	8563.8245									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	9.4400									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

Bin #GFLU001187

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☑ YES
☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865022 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER
CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-11-0008

CONTACT
Rich Loden

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE
12/9/10

CONTACT

TELEPHONE (Include Area Code)
865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt

DATE
12-9-10

7. FORM 540 AND 540A PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A 1 PAGE(S)
FORM 542 AND 542A None PAGE(S)
ADDITIONAL INFORMATION None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-11-0008

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE

TITLE Shipping Coordinator

DATE 12/9/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
RQ, UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162) (asbestos), 1 CM	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	LSA-II	14660 LBS; 678 FT3	Q00248120
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) __ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	2921.5886	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	3.2205			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0008

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00248120/CA2890012584	2	19.1988	6649.6646	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	7.01000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	7.3300	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	4.77000E-01	5.1430E-02	1.3900E-03	
												H-3	4.97000E+02	5.3650E+01	1.4500E+00	
												K-40	1.91000E+02	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	2.77000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	5.86000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	1.35000E-01	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	4.00000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.60000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.87000E+01	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	3.51000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
Shipment Totals		19.1988	6649.6646									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	
		678.0000	7.3300													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0008
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Contact Name
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865022 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. RQ, UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (asbestos) [ERG 162] (9063-~~48~~-11) NSX	1	CM	14660	P	332		
						F001		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This is an exclusive use shipment.
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT Shipping paper.
Load Number 9063-11-0008, ShipDoc Number L-143335, Container Number Q00248120. Bin #GFL001187

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A Graham ~~Michael E Loden~~ on behalf of LLNL
Signature:
Month 12 Day 09 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Waio Taylor
Signature:
Month 12 Day 09 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====> EPA MANIFEST NUMBER: 005865021 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-11-0007
☑ GENERATOR TYPE (Specify) G

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-6-10

CONTACT:
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE ==> Authorized carrier acknowledging waste receipt
DATE: 12-06-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0007

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE -- Authorized consignee acknowledging waste receipt
DATE:

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: SHIPPING COORDINATOR DATE: 12/06/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
RQ, UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), Fissile Excepted (asbestos), 1 CM, (ERG 162)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	LSA-II	13880 LBS; 678 FT3	Q00248123
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 2685.7206 ton 2.9605	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0007

3. PAGE 1 **OF** 1 **PAGE(S)**

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15. RADIOLOGICAL DESCRIPTION				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	
Q00248123/CA2890012584	2	19.1988	6295.8625	1.0000E-03	0.0000E+00	NP	29	19.1988	100 100	Oxide/NP	NP	Am-241	7.63000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	6.9400	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	5.19000E-01	5.1430E-02	1.3900E-03	
												H-3	5.41000E+02	5.3650E+01	1.4500E+00	
												K-40	2.08000E+02	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	3.01000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	6.38000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	1.47000E-01	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	4.35000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.74000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	2.03000E+01	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	3.82000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	6295.8625									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	6.9400									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0007
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Contact Name
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865021 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. RQ UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (fissile excepted) (asbestos) [ERG 162] (9083-11)	1	CM	13880	P	151 F001		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This is an exclusive use shipment.
Load Nr 9083-11-0007, ShipDoc Nr L-143278
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper. CONTAINER Q00248123

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Graham ~~Richard B. Rodel~~ on behalf of LLNL
Signature:
Month 12 Day 06 Year 10

INT'L
16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER
17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Waio Taylor
Signature:
Month 12 Day 06 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY
18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1 EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2 IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☑ YES
☐ NO

3 TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4 DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ======>

EPA MANIFEST NUMBER
005865017JJK

5 SHIPPER -- NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER
CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-11-0006

CONTACT
Kimberly A. Fugmann

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

6. CARRIER -- Name and Address
Visionary Solutions
111 Union Valley Road Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE
12/03/2010

CONTACT
Dispatch

TELEPHONE (Include Area Code)
865-482-3896

SIGNATURE -- Authorized carrier acknowledging waste receipt

DATE
12-06-10

7 FORM 540 AND 540A PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A 1 PAGE(S)
FORM 542 AND 542A None PAGE(S)
ADDITIONAL INFORMATION None PAGE(S)

8 MANIFEST NUMBER (Use this number on all continuation pages)
9063-11-0006

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE -- Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations

AUTHORIZED SIGNATURE

TITLE
Shipping Coordinator

DATE
12/6/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
RQ, UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 Fissile Excepted (asbestos) [ERG 162], (01 CM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	8.0663E+01	2.1801E+00	LSA-II	13880 LBS; 678 FT3	Q00248122
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT
1	m3 19.1988 ft3 678.0000	kg 2957.8760 ton 3.2605

SPECIAL NUCLEAR MATERIAL (grams)

U-233	U-235	Pu	Total
NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0006

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00248122/0110000015	19 OTHER.	19.1988	6295.8625	1.0000E-03	NP	NP	29,28-HI	19.1988	100 100	oxide/NP	NP	Am-241	6.92000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	6.9400	1.0000E-01	NP	NP		678.0000				Am-243	4.71000E-01	5.1430E-02	1.3900E-03	
												H-3	4.91000E-02	5.3650E+01	1.4500E+00	
												K-40	1.88000E+02	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	2.74000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	5.79000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	1.34000E-01	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	3.95000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.58000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.85000E+01	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	3.47000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
Shipment Totals		19.1988	6295.8625									SNM [2.9147E-05 g] Source [6.3700E-01 kg]				
		678.0000	6.9400									SNM [2.9147E-05 g] Source [6.3700E-01 kg]		8.0663E+01	2.1801E+00	

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification
90. Cement
91. Concrete (encapsulation)
92 Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0006
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865017 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. RQ, UN3321, Waste, Radioactive material, low specific activity (LSA-II) Fissile Excepted, 7 (asbestos) [ERG 162] (9063-11)	1	CM	13880	P	131 F001		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
BAAQMD 939 Ellis St., San Francisco, Ca 94100 This is an exclusive Use Shipment. Load #9063-11-0006, Ship Doc No. L-143255, Container# Q00248122 Registrant Name: LLNL Emergency Dispatch

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A Graham on behalf of LLNL
Signature
Month 12 Day 06 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Waco Taylor
Signature
Month 12 Day 06 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

GENERATOR INT'L TRANSPORTER DESIGNATED FACILITY

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4303 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number >>>>>>: 005885018JJK

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-758)
Livermore, CA 94550

Utah Generator Site Access Permit No: 0110000018
SHIPMENT NUMBER: 9063-11-0005

CONTACT: Kimberly A. Fugmann

6. CARRIER – Name and Address
Visionary Solutions
111 Union Valley Road Suite B
Oak Ridge, TN 37830

CONTACT: Dispatch

SIGNATURE – Authorized carrier representative acknowledging waste receipt

SHIPPER ID NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: NMR000013088

SHIPPING DATE: 12/03/2010

TELEPHONE (Include Area Code): 865-482-3896

DATE: 12-3-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0005

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

M11528

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE: 12-16-10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE

TITLE: Shipping Coordinator

DATE: 12/23/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
RQ, UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7, Fissile Excepted (asbestos) [ERG 162] (01 CM)	NA	NA	solid oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	8.0663E+01	2.1801E+00	LSA-II	16260 LBS; 678 FT3	Q00248121

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
X No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if the shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-09)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	3547.5462	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	3.9105			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	8.0663E+01	5.3650E+01	NP	NP	NP	(kg)	6.3700E-01
mCi	2.1801E+00	1.4500E+00	NP	NP	NP	(tons)	7.0217E-04

2. MANIFEST NUMBER 9063-11-0005

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mrSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
												RADIONUCLIDES	pCi/gm	MBq	mCi	
[illegible]015	19 OTHER	19.1988	7375.4124	1.0000E-00	NP	NP	29,28-HI	19.1988	100 100	oxide/NP	NP	Am-241	5.77000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	8.1308	1.0000E-00	NP	NP		678.0000				Am-243	3.93000E-01	5.1430E-02	1.3900E-03	
												H-3	4.09000E+02	5.3650E+01	1.4500E+00	
												K-40	1.57000E+02	2.0609E+01	5.5700E-01	
												Pu-238 [4.6700E-09 g]	2.28000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	4.83000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	1.11000E-01	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	3.29000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.32000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.54000E+01	2.0202E+00	5.4600E-02	
												U-Nat [1.4500E-01 kg]	2.89000E+01	3.8110E+00	1.0300E-01	
												Subtotal		8.0663E+01	2.1801E+00	
												Total		8.0663E+01	2.1801E+00	
												SNM [2.9147E-05 g]				
												Source [6.3700E-01 kg]				
Shipment Totals		19.1988	7375.4124									SNM [2.9147E-05 g]		8.0663E+01	2.1801E+00	
		678.0000	8.1308									Source [6.3700E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural overpacks the numerical code must be followed by "-S".

1. Modern Box or Drum
2. Steel Box
3. Plastic Drum or Pail
4. Steel Drum or Pail
5. Steel Drum or Liner
6. Concrete Tank or Liner
7. Steel Tank or Liner
8. Fiberglass Tank or Liner
9. Demonstration
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as maybe applicable)

A. Dedicated
B. Intermodal
C. End Dump
D. Roll-off
E. Shaker

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-05)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0005
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	2.0609E+01	5.5700E-01
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	3.8110E+00	1.0300E-01

FORM 540 — **EnergySolutions, LLC**

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☑ YES
☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 3

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865085JJK

5. SHIPPER -- NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER
CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No
0110000015

SHIPMENT NUMBER
9063-11-0004

CONTACT
Kimberly A. Fugmann

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

6. CARRIER -- Name and Address
Visionary Solutions
111 Union Valley Road Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE

CONTACT
Dispatch

TELEPHONE (Include Area Code)
865-482-3896

SIGNATURE -- Authorized carrier acknowledging waste receipt

DATE
1-4-2011

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 2 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-11-0004

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE -- Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE — TITLE: Shipping Coordinator — DATE: 1-4-11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES			16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat		2.5867E+01	6.9910E-01	LSA-II	3802 LBS; 48 FT3	Q00248131
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat		2.5134E+01	6.7930E-01	LSA-II	3714 LBS; 48 FT3	Q00248132
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01CM)	NA	NA	solid oxide	H-3	U-Nat		1.7412E+01	4.7060E-01	LSA-II	2754 LBS; 48 FT3	Q00248133

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
3	m3	4.0776	kg	3855.5355	NP	NP	NP	NP
	ft3	144.0000	ton	4.2500				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	6.8413E+01	2.8490E+00	NP	NP	NP	(kg)	2.5130E+00
mCi	1.8490E+00	7.7000E-02	NP	NP	NP	(tons)	2.7701E-03

2. MANIFEST NUMBER 9063-11-0004

3. PAGE 1 OF 2 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00248131/0110000015	2	1.3592	1724.5583	1.0000E-03	NP	NP	29,28-H	1.3592	100 100	oxide/NP	NP	H-3	2.00000E+01	1.0767E+00	2.9100E-02	AU
												U-Nat [9.5000E-01 kg]	4.60000E+02	2.4790E+01	6.7000E-01	
		48.0000	1.9010	1.0000E-01	NP	NP		48.0000				Subtotal		2.5867E+01	6.9910E-01	
												Total		2.5867E+01	6.9910E-01	
												Source [9.5000E-01 kg]				
Q00248132/0110000015	2	1.3592	1684.6422	1.0000E-03	NP	NP	29,28-H	1.3592	100 100	oxide/NP	NP	H-3	2.00000E+01	1.0471E+00	2.8300E-02	AU
												U-Nat [9.2400E-01 kg]	4.60000E+02	2.4087E+01	6.5100E-01	
		48.0000	1.8570	1.0000E-01	NP	NP		48.0000				Subtotal		2.5134E+01	6.7930E-01	
												Total		2.5134E+01	6.7930E-01	
												Source [9.2400E-01 kg]				
Q00248133/0110000015	2	1.3592	1249.1935	1.0000E-03	NP	NP	29,28-H	1.3592	100 100	oxide/NP	NP	H-3	2.00000E+01	7.2520E-01	1.9600E-02	AU
												U-Nat [6.3900E-01 kg]	4.59000E+02	1.6687E+01	4.5100E-01	
		48.0000	1.3770	1.0000E-01	NP	NP		48.0000				Subtotal		1.7412E+01	4.7060E-01	
												Total		1.7412E+01	4.7060E-01	
												Source [6.3900E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

EnergySolutions, LLC

2. MANIFEST NUMBER 9063-11-0004

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15. RADIOLOGICAL DESCRIPTION				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5 CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3)/(ft3)	8 WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	
Shipment Totals		4.0776	4658.3940									Source [2.5130E+00 kg]		6.8413E+01	1.8490E+00	
		144.0000	5.1350													

FORM 541A (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0004
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	2.8490E+00	7.7000E-02
U-Nat	6.5564E+01	1.7720E+00

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865085 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt/Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (9063-11)	3	CM	10270	P	352 F003		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper. This is an exclusive Use Shipment. Load# 9063-11-0004, Ship Doc No. L-143064. Container #'s Q00248131, Q00248132, Q00248133

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Kimberly A. Fugmann on behalf of LLNL
Signature: [signature]
Month 1 Day 4 Year 11

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 1 Day 4 Year 11
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4208 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 13

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number >>>>>: 005885084JJK

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No: 0110000015

SHIPMENT NUMBER: 9063-11-0003

CONTACT: Kimberly A. Fugmann

6. CARRIER – Name and Address
Visionary Solutions
111 Union Valley Road Suite B
Oak Ridge, TN 37830

CONTACT: Dispatch

SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]

SHIPPER ID NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: NMR000013038

SHIPPING DATE

TELEPHONE (Include Area Code): 865-482-3396

DATE: 1-4-2011

7. FORM 540 AND 540A — PAGE 1 OF 3 PAGE(S)
FORM 541 AND 541A — 6 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0003

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11591

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]

DATE: 1-5-11

10. CERTIFICATION
This is to certify that the hereinnamed materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 1-4-11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat			1.6099E+00	4.3510E-02	LSA-II	1100 LBS; 116 FT3	Q00249359
UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat			1.4515E+00	3.9230E-02	LSA-II	1080 LBS; 116 FT3	Q00249360
NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 DM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	3.9373E-01	1.0841E-02	NA	204 LBS; 8 FT3	Q00248136
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						
NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG171] (01 DM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	5.2714E-01	1.4247E-02	NA	256 LBS; 8 FT3	Q00248204
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

- ___ Record Waste Description Inadequate
- ___ Contamination or Leakage Detected
- ___ Unexpected Exposure Rates Detected
- ___ Labels, Markings, etc. Inadequate
- ___ Container Integrity Inadequate
- ___ Other
- ✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ___ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540A

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER (CONTINUATION)

8. MANIFEST NUMBER (Use this number on all continuation pages) 9063-11-0003

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous waste, solid, n.o.s. (F005), 9, III [ERG 171] (01 BA)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	4.6442E-01	1.2552E-02	NA	611 LBS; 95 FT3	Q00248145
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						
RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 BA) (asbestos)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	1.9687E+00	5.3207E-02	NA	1074 LBS; 95 FT3	Q00248130
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						
RQ, NA3077,Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 DM) (asbestos)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	3.0255E-01	8.1770E-03	NA	168 LBS; 8 FT3	Q00248138
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						
RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG171] (01 DM) (asbestos)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	1.8923E-01	5.1143E-03	NA	122 LBS; 8 FT3	Q00248144
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						
RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 BA) (asbestos)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	2.0890E+00	5.6460E-02	NA	1054 LBS; 95 FT3	Q00249365
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						
RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 BA) (asbestos)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	1.7399E+00	4.7024E-02	NA	915 LBS; 95 FT3	Q00249367
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						
RQ, NA3077, Hazardous waste, solid, n.o.s. (F002, F005), 9, III [ERG 171] (01 BA) (asbestos)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	9.7779E-01	2.6427E-02	NA	718 LBS; 95 FT3	Q00249368
				Pu-238	Pu-239	Pu-240	Pu-241					

FORM 540A

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER (CONTINUATION)

8. MANIFEST NUMBER (Use this number on all continuation pages) 9063-11-0003

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
RQ, NA3077, Hazardous waste, solid, n.o.s. (F002, F005), 9, III [ERG 171] (01 BA) (asbestos)	NA	NA	solid oxide	Pu-242	Th-232	U-Nat		9.7779E-01	2.6427E-02	NA	718 LBS; 95 FT3	Q00249368
RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 DM) (asbestos)	NA	NA	solid oxide	Am-241 Pu-238	Am-243 Pu-239	H-3 Pu-240	K-40 Pu-241	2.1695E-01	5.8636E-03	NA	134 LBS; 8 FT3	Q00249930
				Pu-242	Th-232	U-Nat						
RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 DM) (asbestos)	NA	NA	solid oxide	Am-241 Pu-238	Am-243 Pu-239	H-3 Pu-240	K-40 Pu-241	2.5351E-01	6.8516E-03	NA	148 LBS; 8 FT3	Q00249931
				Pu-242	Th-232	U-Nat						

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
13	m3	20.9827	kg	1710.9505	NP	NP	2.8500E+10 11 Containers	2.8500E+10
	ft3	741.0000	ton	1.8860				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	1.2184E+01	6.1994E+00	NP	NP	NP	(kg)	1.8438E-01
mCi	3.2930E-01	1.6755E-01	NP	NP	NP	(tons)	2.0325E-04

2. MANIFEST NUMBER 9063-11-0003

3. PAGE 1 OF 6 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3) / (ft3)	8 WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13 SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14 CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15 RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00248130/0110000015	19 OTHER.	2.6901	487.1582	2.0000E-04	NP	NP	29-HI	2.6901	100 100	oxide/NP	NP	Am-241	1.39000E-02	1.8463E-04	4.9900E-06	AU
		95.0000	0.5370	2.0000E-02	NP	NP		95.0000				Am-243	9.43000E-02	1.2580E-03	3.4000E-05	
												H-3	9.82000E+01	1.3098E+00	3.5400E-02	
												K-40	3.77000E+01	5.0320E-01	1.3600E-02	
												Pu-238 [1.1400E-10 g]	5.48000E-03	7.2890E-05	1.9700E-06	
												Pu-239 [6.6500E-07 g]	1.16000E-01	1.5466E-03	4.1800E-05	
												Pu-240 [4.2000E-08 g]	2.68000E-02	3.5668E-04	9.6400E-06	
												Pu-241 [2.7100E-09 g]	7.91000E-01	1.0545E-02	2.8500E-04	
												Pu-242 [2.8500E+10 g]	3.17000E-06	4.2180E-08	1.1400E-09	
												Th-232 [1.2000E-02 kg]	3.69000E+00	4.9210E-02	1.3300E-03	
												U-Nat [3.5400E-03 kg]	6.94000E+00	9.2500E-02	2.5000E-03	
												Subtotal		1.9687E+00	5.3207E-02	
												Total		1.9687E+00	5.3207E-02	
												SNM [2.8500E+10 g]				
												Source [1.5540E-02 kg]				
Q00248136/0110000015	4	0.2265	92.5328	3.0000E-04	NP	NP	29-HI	0.1982	100 100	oxide/NP	NP	Am-241	1.40000E-02	3.6926E-05	9.9800E-07	AU
		8.0000	0.1020	3.0000E-02	NP	NP		7.0000				Am-243	9.54000E-02	2.5123E-04	6.7900E-06	
												H-3	9.94000E+01	2.6196E-01	7.0800E-03	
												K-40	3.81000E+01	1.0064E-01	2.7200E-03	
												Pu-238 [2.2800E-11 g]	5.54000E-03	1.4615E-05	3.9500E-07	
												Pu-239 [1.3300E-07 g]	1.17000E-01	3.0895E-04	8.3500E-06	
												Pu-240 [8.4000E-09 g]	2.71000E-02	7.1410E-05	1.9300E-06	
												Pu-241 [5.4200E-10 g]	8.00000E-01	2.1090E-03	5.7000E-05	
												Pu-242 [5.6900E-11 g]	3.20000E-06	8.4360E-09	2.2800E-10	

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20 Charcoal
21 Incinerator Ash
22 Soil
23 Gas
24 Oil
25 Aqueous Liquid
26 Filter Media
27 Mechanical Filter
28 EPA or State Hazardous
29 Demolition Rubble
30 Cation Ion-exchange Media
31 Anion Ion-exchange Media
32 Mixed Bed Ion-exchange Media
33 Contaminated Equipment
34 Organic Liquid (except oil)
35 Glassware or Labware
36 Sealed Source/Device
37 Paint or Plating
38 Evaporator Bottoms/Sludges/ Concentrates
39 Compactable Trash
40 Noncompactable Trash
41 Animal Carcass
42 Biological Material (except animal carcass)
43 Activated Material
59 Other Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification

90 Cement
91 Concrete (encapsulation)
92 Bitumen
93 Vinyl Chloride
94 Vinyl Ester Styrene
99 Other Describe in item 13, or additional page
100 None Required.

FORM 541 (03-06)

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

EnergySolutions, LLC

2. MANIFEST NUMBER 9063-11-0003

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15. RADIOLOGICAL DESCRIPTION				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5 CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13 SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	
												Th-232 [2.4000E-03 kg]	3.74000E+00	9.8420E-03	2.6600E-04	
												U-Nat [7.0800E-04 kg]	7.01000E+00	1.8500E-02	5.0000E-04	
												Subtotal		3.9373E-01	1.0641E-02	
												Total		3.9373E-01	1.0641E-02	
												SNM [1.4202E-07 g]				
												Source [3.1080E-03 kg]				
Q00248138/0110000015	4	0.2265	76.2035	3.0000E-04	NP	NP	29-HI	0.1982	100 100	oxide/NP	NP	Am-241	1.40000E-02	2.8416E-05	7.6800E-07	AU
												Am-243	9.52000E-02	1.9351E-04	5.2300E-06	
		8.0000	0.0840	3.0000E-02	NP	NP		7.0000				H-3	9.92000E+01	2.0128E-01	5.4400E-03	
												K-40	3.81000E+01	7.7330E-02	2.0900E-03	
												Pu-238 [1.7500E-11 g]	5.53000E-03	1.1248E-05	3.0400E-07	
												Pu-239 [1.0200E-07 g]	1.17000E-01	2.3754E-04	6.4200E-06	
												Pu-240 [6.4600E-09 g]	2.70000E-02	5.4760E-05	1.4800E-06	
												Pu-241 [4.1700E-10 g]	7.98000E-01	1.6206E-03	4.3800E-05	
												Pu-242 [4.3800E-11 g]	3.19000E-06	6.4750E-09	1.7500E-10	
												Th-232 [1.8500E-03 kg]	3.73000E+00	7.5850E-03	2.0500E-04	
												U-Nat [5.4500E-04 kg]	7.00000E+00	1.4208E-02	3.8400E-04	
												Subtotal		3.0255E-01	8.1770E-03	
												Total		3.0255E-01	8.1770E-03	
												SNM [1.0894E-07 g]				
												Source [2.3950E-03 kg]				
Q00248144/0110000015	4	0.2265	55.3383	3.0000E-04	NP	NP	29-HI	0.1982	100 100	oxide/NP	NP	Am-241	1.40000E-02	1.7760E-05	4.8000E-07	AU
												Am-243	9.60000E-02	1.2099E-04	3.2700E-06	
		8.0000	0.0610	3.0000E-02	NP	NP		7.0000				H-3	1.00000E+02	1.2580E-01	3.4000E-03	
												K-40	3.84000E+01	4.8470E-02	1.3100E-03	
												Pu-238 [1.1000E-11 g]	5.58000E-03	7.0300E-06	1.9000E-07	
												Pu-239 [6.4000E-08 g]	1.18000E-01	1.4837E-04	4.0100E-06	
												Pu-240 [4.0400E-09 g]	2.72000E-02	3.4299E-05	9.2700E-07	
												Pu-241 [2.6100E-10 g]	8.05000E-01	1.0138E-03	2.7400E-05	
												Pu-242 [2.7400E-11 g]	3.22000E-06	4.0700E-09	1.1000E-10	
												Th-232 [1.1500E-03 kg]	3.76000E+00	4.7360E-03	1.2800E-04	
												U-Nat [3.4100E-04 kg]	7.06000E+00	8.8800E-03	2.4000E-04	
												Subtotal		1.8923E-01	5.1143E-03	
												Total		1.8923E-01	5.1143E-03	

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

EnergySolutions, LLC

2. MANIFEST NUMBER 9063-11-0003

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15 RADIOLOGICAL DESCRIPTION				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3)/(ft3)	8 WASTE AND CONTAINER WEIGHT (kg)/(lon)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13 SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	
												SNM [6.8339E-08 g]				
												Source [1.4910E-03 kg]				
Q00248145/0110000015	19 OTHER.	2.6901	277.1450	2.0000E-04	NP	NP	29-HI	2.6901	100 100	oxide/NP	NP	Am-241	1.30000E-02	4.3660E-05	1.1800E-06	AU
												Am-243	8.85000E-02	2.9637E-04	8.0100E-06	
												H-3	9.22000E+01	3.0895E-01	8.3500E-03	
		95.0000	0.3055	2.0000E-02	NP	NP		95.0000				K-40	3.54000E+01	1.1877E-01	3.2100E-03	
												Pu-238 [2.6900E-11 g]	5.14000E-03	1.7205E-05	4.6500E-07	
												Pu-239 [1.5700E-07 g]	1.09000E-01	3.6445E-04	9.8500E-06	
												Pu-240 [9.9100E-09 g]	2.51000E-02	8.3990E-05	2.2700E-06	
												Pu-241 [6.4000E-10 g]	7.42000E-01	2.4864E-03	6.7200E-05	
												Pu-242 [6.7200E-11 g]	2.97000E-06	9.9530E-09	2.6900E-10	
												Th-232 [2.8300E-03 kg]	3.47000E+00	1.1618E-02	3.1400E-04	
												U-Nat [8.3500E-04 kg]	6.51000E+00	2.1793E-02	5.8900E-04	
												Subtotal		4.6442E-01	1.2552E-02	
												Total		4.6442E-01	1.2552E-02	
												SNM [1.6764E-07 g]				
												Source [3.6650E-03 kg]				
Q00248204/0110000015	4	0.2265	116.1197	4.0000E-04	NP	NP	29-HI	0.1982	100 100	oxide/NP	NP	Am-241	1.41000E-02	4.9580E-05	1.3400E-06	AU
												Am-243	9.60000E-02	3.3670E-04	9.1000E-06	
												H-3	1.00000E+02	3.5076E-01	9.4800E-03	
		8.0000	0.1280	4.0000E-02	NP	NP		7.0000				K-40	3.84000E+01	1.3468E-01	3.6400E-03	
												Pu-238 [3.0500E-11 g]	5.58000E-03	1.9573E-05	5.2900E-07	
												Pu-239 [1.7800E-07 g]	1.18000E-01	4.1440E-04	1.1200E-05	
												Pu-240 [1.1300E-08 g]	2.72000E-02	9.5460E-05	2.5800E-06	
												Pu-241 [7.2700E-10 g]	8.05000E-01	2.8231E-03	7.6300E-05	
												Pu-242 [7.6300E-11 g]	3.22000E-06	1.1285E-08	3.0500E-10	
												Th-232 [3.2100E-03 kg]	3.76000E+00	1.3209E-02	3.5700E-04	
												U-Nat [9.4900E-04 kg]	7.06000E+00	2.4753E-02	6.6900E-04	
												Subtotal		5.2714E-01	1.4247E-02	
												Total		5.2714E-01	1.4247E-02	
												SNM [1.9013E-07 g]				
												Source [4.1590E-03 kg]				

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

EnergySolutions, LLC

2. MANIFEST NUMBER 9063-11-0003

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15. RADIOLOGICAL DESCRIPTION				
5 CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3)/(ft3)	8 WASTE AND CONTAINER WEIGHT (kg)/(lon)	9 SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249359/0110000015	2	3.2848	498.9516	3.0000E-04	NP	NP	29-HI	3.1715	100 100	oxide/NP	NP	H-3	2.00000E+01	6.6970E-02	1.8100E-03	AU
												U-Nat [5.9200E-02 kg]	4.60000E+02	1.5429E+00	4.1700E-02	
		116.0000	0.5500	3.0000E-02	NP	NP		112.0000				Subtotal		1.6099E+00	4.3510E-02	
												Total		1.6099E+00	4.3510E-02	
												Source [5.9200E-02 kg]				
Q00249360/0110000015	2	3.2848	489.8798	4.0000E-04	NP	NP	29-HI	3.1715	100 100	oxide/NP	NP	H-3	2.00000E+01	6.0310E-02	1.6300E-03	AU
												U-Nat [5.3200E-02 kg]	4.60000E+02	1.3912E+00	3.7600E-02	
		116.0000	0.5400	4.0000E-02	NP	NP		112.0000				Subtotal		1.4515E+00	3.9230E-02	
												Total		1.4515E+00	3.9230E-02	
												Source [5.3200E-02 kg]				
Q00249365/0110000015	19 OTHER.	2.6901	478.0864	3.0000E-04	NP	NP	29-HI	2.6901	100 100	oxide/NP	NP	Am-241	1.77000E-02	1.9610E-04	5.3000E-06	AU
												Am-243	1.21000E-01	1.3357E-03	3.6100E-05	
		95.0000	0.5270	3.0000E-02	NP	NP		95.0000				H-3	1.26000E+02	1.3912E+00	3.7600E-02	
												K-40	4.82000E+01	5.3280E-01	1.4400E-02	
												Pu-238 [1.2100E-10 g]	7.01000E-03	7.7700E-05	2.1000E-06	
												Pu-239 [7.0600E-07 g]	1.48000E-01	1.6391E-03	4.4300E-05	
												Pu-240 [4.4600E-08 g]	3.42000E-02	3.7740E-04	1.0200E-05	
												Pu-241 [2.8800E-09 g]	1.01000E+00	1.1174E-02	3.0200E-04	
												Pu-242 [3.0200E-10 g]	4.05000E-06	4.4770E-08	1.2100E-09	
												Th-232 [1.2700E-02 kg]	4.72000E+00	5.2170E-02	1.4100E-03	
												U-Nat [3.7600E-03 kg]	8.87000E+00	9.8050E-02	2.6500E-03	
												Subtotal		2.0890E+00	5.6460E-02	
												Total		2.0890E+00	5.6460E-02	
												SNM [7.5390E-07 g]				
												Source [1.6460E-02 kg]				
Q00249367/0110000015	19 OTHER.	2.6901	415.0370	2.0000E-04	NP	NP	29-HI	2.6901	100 100	oxide/NP	NP	Am-241	1.89000E-02	1.6354E-04	4.4200E-06	AU
												Am-243	1.29000E-01	1.1137E-03	3.0100E-05	
		95.0000	0.4575	2.0000E-02	NP	NP		95.0000				H-3	1.34000E+02	1.1581E+00	3.1300E-02	
												K-40	5.15000E+01	4.4400E-01	1.2000E-02	
												Pu-238 [1.0100E-10 g]	7.48000E-03	6.4750E-05	1.7500E-06	

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

EnergySolutions, LLC

2. MANIFEST NUMBER 9063-11-0003

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15 RADIOLOGICAL DESCRIPTION				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5 CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3) / (ft3)	8 WASTE AND CONTAINER WEIGHT (kg) / (lon)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0 1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	
												Pu-239 [5.9000E-07 g]	1.58000E-01	1.3690E-03	3.7000E-05	
												Pu-240 [3.7200E-08 g]	3.66000E-02	3.1598E-04	8.5400E-06	
												Pu-241 [2.4000E-09 g]	1.08000E+00	9.3240E-03	2.5200E-04	
												Pu-242 [2.5200E-10 g]	4.32000E-06	3.7370E-08	1.0100E-09	
												Th-232 [1.0600E-02 kg]	5.05000E+00	4.3660E-02	1.1800E-03	
												U-Nat [3.1400E-03 kg]	9.47000E+00	8.1770E-02	2.2100E-03	
												Subtotal		1.7399E+00	4.7024E-02	
												Total		1.7399E+00	4.7024E-02	
												SNM [6.2995E-07 g]				
												Source [1.3740E-02 kg]				
Q00249368/0110000015	19 OTHER.	2.6901	325.6793	3.0000E-04	NP	NP	29-HI	2.6901	100 100	oxide/NP	NP	Am-241	1.12000E-02	9.1760E-05	2.4800E-06	AU
												Am-243	7.61000E-02	6.2530E-04	1.6900E-05	
		95.0000	0.3590	3.0000E-02	NP	NP		95.0000				H-3	7.93000E+01	6.5120E-01	1.7600E-02	
												K-40	3.05000E+01	2.4938E-01	6.7400E-03	
												Pu-238 [5.6500E-11 g]	4.42000E-03	3.6223E-05	9.7900E-07	
												Pu-239 [3.3000E-07 g]	9.36000E-02	7.6590E-04	2.0700E-05	
												Pu-240 [2.0800E-08 g]	2.16000E-02	1.7686E-04	4.7800E-06	
												Pu-241 [1.3500E-09 g]	6.38000E-01	5.2170E-03	1.4100E-04	
												Pu-242 [1.4100E-10 g]	2.55000E-06	2.0905E-08	5.6500E-10	
												Th-232 [5.9500E-03 kg]	2.98000E+00	2.4420E-02	6.6000E-04	
												U-Nat [1.7600E-03 kg]	5.60000E+00	4.5880E-02	1.2400E-03	
												Subtotal		9.7779E-01	2.6427E-02	
												Total		9.7779E-01	2.6427E-02	
												SNM [3.5235E-07 g]				
												Source [7.7100E-03 kg]				
Q00249930/0110000015	4	0.2265	60.7814	2.0000E-04	NP	NP	29-HI	0.1982	100 100	oxide/NP	NP	Am-241	1.39000E-02	2.0350E-05	5.5000E-07	AU
												Am-243	9.49000E-02	1.3875E-04	3.7500E-06	
		8.0000	0.0670	2.0000E-02	NP	NP		7.0000				H-3	9.89000E+01	1.4430E-01	3.9000E-03	
												K-40	3.80000E+01	5.5500E-02	1.5000E-03	
												Pu-238 [1.2600E-11 g]	5.51000E-03	8.0660E-06	2.1800E-07	
												Pu-239 [7.3400E-08 g]	1.17000E-01	1.7020E-04	4.6000E-06	
												Pu-240 [4.6300E-09 g]	2.69000E-02	3.9220E-05	1.0600E-06	
												Pu-241 [2.9900E-10 g]	7.96000E-01	1.1618E-03	3.1400E-05	
												Pu-242 [3.1400E-11 g]	3.19000E-06	4.6620E-09	1.2600E-10	

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

EnergySolutions, LLC

2. MANIFEST NUMBER 9063-11-0003

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14 CHEMICAL DESCRIPTION		15. RADIOLOGICAL DESCRIPTION				
5 CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3) / (ft3)	8 WASTE AND CONTAINER WEIGHT (kg) / (ton)	9 SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13 SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16 WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
												Th-232 [1.3200E-03 kg]	3.72000E+00	5.4390E-03	1.4700E-04	
												U-Nat [3.9000E-04 kg]	6.98000E+00	1.0175E-02	2.7500E-04	
												Subtotal		2.1695E-01	5.8636E-03	
												Total		2.1695E-01	5.8636E-03	
												SNM [7.8373E-08 g]				
												Source [1.7100E-03 kg]				
Q00249931/0110000015	4	0.2265	67.1317	2.0000E-04	NP	NP	29-HI	0.1982	100 100	oxide/NP	NP	Am-241	1.63000E-02	2.3791E-05	6.4300E-07	AU
												Am-243	1.11000E-01	1.6206E-04	4.3800E-06	
												H-3	1.16000E+02	1.6872E-01	4.5600E-03	
		8.0000	0.0740	2.0000E-02	NP	NP		7.0000				K-40	4.44000E+01	6.4750E-02	1.7500E-03	
												Pu-238 [1.4700E-11 g]	6.44000E-03	9.3980E-06	2.5400E-07	
												Pu-239 [8.5700E-08 g]	1.36000E-01	1.9906E-04	5.3800E-06	
												Pu-240 [5.4100E-09 g]	3.15000E-02	4.5880E-05	1.2400E-06	
												Pu-241 [3.4900E-10 g]	9.30000E-01	1.3579E-03	3.6700E-05	
												Pu-242 [3.6700E-11 g]	3.72000E-06	5.4390E-09	1.4700E-10	
												Th-232 [1.5500E-03 kg]	4.34000E+00	6.3270E-03	1.7100E-04	
												U-Nat [4.5600E-04 kg]	8.16000E+00	1.1914E-02	3.2200E-04	
												Subtotal		2.5351E-01	6.8516E-03	
												Total		2.5351E-01	6.8516E-03	
												SNM [9.1510E-08 g]				
												Source [2.0060E-03 kg]				
Shipment Totals		21.3791	3440.0447									SNM [2.8500E+10 g]		1.2184E+01	3.2930E-01	
		755.0000	3.7920									Source [1.8438E-01 kg]				

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0003
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	8.5651E-04	2.3149E-05
Am-243	5.8323E-03	1.5763E-04
H-3	6.1994E+00	1.6755E-01
K-40	2.3295E+00	6.2960E-02
Pu-238	3.3870E-04	9.1540E-06
Pu-239	7.1636E-03	1.9361E-04
Pu-240	1.6519E-03	4.4647E-05
Pu-241	4.8833E-02	1.3198E-03
Pu-242	1.9555E-07	5.2850E-09
Th-232	2.2822E-01	6.1680E-03
U-Nat	3.3625E+00	9.0879E-02

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 2
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865084 JJK

GENERATOR

5. Generator's Name and Mailing Address:
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0133
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (9063-11)	2	CM	2180	P	332 F005		
	2. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-10)	1	DM	256	P	332 F001		
	3. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-11)	1	DM	204	P	332 F001		
	4. NA3077, Hazardous waste, solid, n.o.s. (F005), 9, III [ERG 171] (9063-11)	1	BA	611	P	332 F005		

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only.See NRC Form 540 for DOT shipping paper.This is an exclusive Use Shipment. Load#9063-11-0003,Ship Doc# L-143888.Contact Name:LLNL Emergency Dispatch.See attached for container numbers and additional waste codes.
BAAQMD 939 Ellis St. San Francisco Ca 94109

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Kimberly A. Fugmann on behalf of LLNL
Signature: [signature]
Month 1 Day 4 Year 11

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: [signature]
Month 1 Day 4 Year 11
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number CA2890012584	22. Page 2	23. Manifest Tracking Number 005865084JJK

24. Generator's Name Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-795
Livermore CA 94550

25. Transporter _____ Company Name | U.S. EPA ID Number

26. Transporter _____ Company Name | U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		
	5. RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III (asbestos) [ERG 171] (9063-11)	1	BA	1074	P	151 F001		
	6. RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III (asbestos) [ERG 171] (9063-11)	3	BA	2687	P	352 F001		
	7. RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III (asbestos) [ERG 171] (9063-11)	4	DM	572	P	352 F001		

32. Special Handling Instructions and Additional Information

GENERATOR

33. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

TRANSPORTER

35. Discrepancy

DESIGNATED FACILITY

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Shipment 9063-11-0003

Container	*Page*	*Item*	*Additional Waste codes*
Q00249359	1	1	
Q00249360	1	1	
Q00248204	1	2	F002, F005
Q00248136	1	3	F002, F005
Q00248145	1	4	
Q00248130	2	5	F002, F005
Q00249367	2	6	F002, F005
Q00249365	2	6	F002, F005
Q00249368	2	6	F002, F005
Q00248144	2	7	F002, F005
Q00249931	2	7	F002, F005
Q00248138	2	7	F002, F005
Q00249930	2	7	F002, F005

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (928) 423-4205 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>>>>

EPA MANIFEST NUMBER: 005885012JJX

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No: 0110000016

SHIPMENT NUMBER: 9063-011-0002

CONTACT: Kimberly A. Fugmann

6. CARRIER – Name and Address
Visionary Solutions
111 Union Valley Road Suite B
Oak Ridge, TN 37830

CONTACT: Dispatch

SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: NMR000013088

SHIPPING DATE: 12/09/2010

TELEPHONE (Include Area Code): 865-482-3896

DATE: 12-10-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-11-0002

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11517

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]

DATE: 12/14/2010

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Departments of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-10-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
RQ, NA3077, Hazardous Waste Solid n.o.s. (F001, F002), 9, III (asbestos) [ERG 171] (01 CM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	2.4747E+01	6.6884E-01	NA	21260 LBS; 1345 FT3	Q00241012
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

- ___ Record Waste Description Inadequate
- ___ Contamination or Leakage Detected
- ___ Unexpected Exposure Rates Detected
- ___ Labels, Markings, etc. Inadequate
- ___ Container Integrity Inadequate
- ___ Other
- ✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC.

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 33.0458 ft3 1167.0000	kg 7214.3871 ton 7.9525	NP	NP	8.9271E-06 1 Container	8.9271E-06

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.4747E+01	1.6465E+01	NP	NP	NP	(kg)	1.9550E-01
mCi	6.6884E-01	4.4500E-01	NP	NP	NP	(tons)	2.1550E-04

2. MANIFEST NUMBER 9063-11-0002

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8 WASTE AND CONTAINER WEIGHT (kg) (ton)	9 SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13 SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16 WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00241012/0110000015	2	38.0862	9643.3744	1.0000E-03	NP	NP	28,33,40-HI	33.0458	100 100	oxide/NP	NP	Am-241	8.69000E-03	2.3199E-03	6.2700E-05	AU
		1345.0000	10.6300	1.0000E-01	NP	NP		1167.0000				Am-243	5.92000E-02	1.5799E-02	4.2700E-04	
												H-3	6.16000E+01	1.6465E+01	4.4500E-01	
												K-40	2.37000E+01	6.3270E+00	1.7100E-01	
												Pu-238 [1.4300E-09 g]	3.44000E-03	9.1760E-04	2.4800E-05	
												Pu-239 [8.3600E-06 g]	7.27000E-02	1.9425E-02	5.2500E-04	
												Pu-240 [5.2800E-07 g]	1.68000E-02	4.4770E-03	1.2100E-04	
												Pu-241 [3.4100E-08 g]	4.96000E-01	1.3246E-01	3.5800E-03	
												Pu-242 [3.5800E-09 g]	1.98000E-06	5.2910E-07	1.4300E-08	
												Th-232 [1.5100E-01 kg]	2.32000E+00	6.1790E-01	1.6700E-02	
												U-Nat [4.4500E-02 kg]	4.35000E+00	1.1618E+00	3.1400E-02	
												Subtotal		2.4747E+01	6.6884E-01	
												Total		2.4747E+01	6.6884E-01	
												SNM [8.9271E-06 g] Source [1.9550E-01 kg]				
Shipment Totals		38.0862	9643.3744									SNM [8.9271E-06 g] Source [1.9550E-01 kg]		2.4747E+01	6.6884E-01	
		1345.0000	10.6300													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other Describe in item 13, or additional page
100. None Required

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-11-0002
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	2.3199E-03	6.2700E-05
Am-243	1.5799E-02	4.2700E-04
H-3	1.6465E+01	4.4500E-01
K-40	6.3270E+00	1.7100E-01
Pu-238	9.1760E-04	2.4800E-05
Pu-239	1.9425E-02	5.2500E-04
Pu-240	4.4770E-03	1.2100E-04
Pu-241	1.3246E-01	3.5800E-03
Pu-242	5.2910E-07	1.4300E-08
Th-232	6.1790E-01	1.6700E-02
U-Nat	1.1618E+00	3.1400E-02

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865012 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. RQ, NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III (asbestos) [ERG 171] (9063-11)	1	CM	21260	P	181 F001		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
Container Number Q00241012 Load #9063-11-0002, Ship Doc No.L-142980. Registrant Name:
LLNL Emergency Dispatch BAAQMD 939 Ellis St., San Francisco, Ca 94100

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Kimberly A. Fugmann on behalf of LLNL
Signature: Kimberly A. Fugmann
Month 12 Day 10 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Ronald Comese
Signature: [signature]
Month 12 Day 10 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1 EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2 IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3 TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 5

4 DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865025JJK

5 SHIPPER -- NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No: 0110000015
SHIPMENT NUMBER: 9063-10-0003

CONTACT: Kimberly A. Fugmann

6. CARRIER -- Name and Address
Visionary Solutions
111 Union Valley Road Suite B
Oak Ridge, TN 37830

CONTACT: Dispatch

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: NMR000013086

SHIPPING DATE: 12-16-10

TELEPHONE (Include Area Code): 865-482-3896

DATE: 12-16-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 2 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-10-0003

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE | TITLE: Shipping Coordinator | DATE: 12-16-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES		16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	4.8263E+01	1.3044E+00	LSA-II	6900 LBS; 116 FT3	Q00249349
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	3.4632E+01	9.3600E-01	LSA-II	5200 LBS; 116 FT3	Q00249350
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	4.7867E+01	1.2937E+00	LSA-II	6820 LBS; 116 FT3	Q00249351
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	4.8259E+01	1.3043E+00	LSA-II	6880 LBS; 116 FT3	Q00249352
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	3.8994E+01	1.0539E+00	LSA-II	5620 LBS; 111 FT3	Q00249353

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
5	m3 15.5743 ft3 550.0000	kg 12265.1385 ton 13.5200	NP	NP	NP	NP

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.1802E+02	9.0761E+00	NP	NP	NP	(kg)	7.9900E+00
mCi	5.8923E+00	2.4530E-01	NP	NP	NP	(tons)	8.8075E-03

2. MANIFEST NUMBER 9063-10-0003

3. PAGE 1 OF 2 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3)/(ft3)	8 WASTE AND CONTAINER WEIGHT (kg)/(ton)	9 SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13 SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14 CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15 RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16 WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249349/0110000015	2	3.2848	3129.7876	5.0000E-04	NP	NP	22,28-H	3.1715	100 100	oxide/NP	NP	H-3	2.00000E+01	2.0128E+00	5.4400E-02	AU
												U-Nat [1.7700E+00 kg]	4.60000E+02	4.6250E+01	1.2500E+00	
		116.0000	3.4500	5.0000E-02	NP	NP		112.0000				Subtotal		4.8263E+01	1.3044E+00	
												Total		4.8263E+01	1.3044E+00	
												Source [1.7700E+00 kg]				
Q00249350/0110000015	2	3.2848	2358.6805	5.0000E-04	NP	NP	22,28-H	3.1715	100 100	oxide/NP	NP	H-3	2.00000E+01	1.4430E+00	3.9000E-02	AU
												U-Nat [1.2700E+00 kg]	4.60000E+02	3.3189E+01	8.9700E-01	
		116.0000	2.6000	5.0000E-02	NP	NP		112.0000				Subtotal		3.4632E+01	9.3600E-01	
												Total		3.4632E+01	9.3600E-01	
												Source [1.2700E+00 kg]				
Q00249351/0110000015	2	3.2848	3093.5002	9.0000E-04	NP	NP	22,28-H	3.1715	100 100	oxide/NP	NP	H-3	2.00000E+01	1.9869E+00	5.3700E-02	AU
												U-Nat [1.7500E+00 kg]	4.60000E+02	4.5880E+01	1.2400E+00	
		116.0000	3.4100	9.0000E-02	NP	NP		112.0000				Subtotal		4.7867E+01	1.2937E+00	
												Total		4.7867E+01	1.2937E+00	
												Source [1.7500E+00 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

EnergySolutions, LLC

2. MANIFEST NUMBER 9063-10-0003

3. PAGE 2 OF 2 PAGE(S)

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15 RADIOLOGICAL DESCRIPTION				16 WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5 CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3)/(ft3)	8 WASTE AND CONTAINER WEIGHT (kg)/(ton)	9 SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	
Q00249352/0110000015	2	3.2848	3120.7157	9.0000E-04	NP	NP	22,28-H	3.1715	100 100	oxide/NP	NP	H-3	2.00000E+01	2.0091E+00	5.4300E-02	AU
												U-Nat [1.7700E+00 kg]	4.60000E+02	4.6250E+01	1.2500E+00	
		116.0000	3.4400	9.0000E-02	NP	NP		112.0000				Subtotal		4.8259E+01	1.3043E+00	
												Total		4.8259E+01	1.3043E+00	
												Source [1.7700E+00 kg]				
Q00249353/0110000015	2	3.1432	2549.1893	3.0000E-04	NP	NP	22,28-H	2.8883	100 100	oxide/NP	NP	H-3	2.00000E+01	1.6243E+00	4.3900E-02	AU
												U-Nat [1.4300E+00 kg]	4.60000E+02	3.7370E+01	1.0100E+00	
		111.0000	2.8100	3.0000E-02	NP	NP		102.0000				Subtotal		3.8994E+01	1.0539E+00	
												Total		3.8994E+01	1.0539E+00	
												Source [1.4300E+00 kg]				
Shipment Totals		16.2824	14251.8733									Source [7.9900E+00 kg]		2.1802E+02	5.8923E+00	
		575.0000	15.7100													

FORM 541A (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-10-0003
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	9.0761E+00	2.4530E-01
U-Nat	2.0894E+02	5.6470E+00

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865025 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (9083-10)	5	CM	31420	P	352		
						F005		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper. This is an exclusive Use Shipment. Load # 9083-10-0003, Ship Doc No. L-143089. Container#'s Q00249349, Q00249350, Q00249351, Q00249352, Q00249353. Registrant Name: LLNL Emergency Dispatch

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Kimberly A. Fugmann on behalf of LLNL
Signature: [signature]
Month 12 Day 16 Year 10

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Ronald Comese
Signature: [signature]
Month 12 Day 16 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? [✓] YES [ ] NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 5

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? [✓] YES [ ] NO
If "Yes," provide Manifest Number =====> EPA MANIFEST NUMBER: 005865089JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
[ ] COLLECTOR
[ ] PROCESSOR
[✓] GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-10-0002

CONTACT: Kimberly A. Fugmann
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions
111 Union Valley Road Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-21-10

CONTACT: Dispatch
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 12-21-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 2 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-10-0002

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE:

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-21-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES		16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	3.8613E+01	1.0436E+00	LSA-II	5580 LBS; 111 FT3	Q00249354
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	3.9387E+01	1.0645E+00	LSA-II	5680 LBS; 111 FT3	Q00249355
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	3.2778E+01	8.8590E-01	LSA-II	4660 LBS; 48 FT3	Q00249356
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	3.4092E+01	9.2140E-01	LSA-II	4820 LBS; 48 FT3	Q00249357
Waste, UN3321, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (01 CM)	NA	NA	solid oxide	H-3	U-Nat	3.3899E+01	9.1620E-01	LSA-II	4800 LBS; 48 FT3	Q00249358

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
5	m3 9.8542 / ft3 348.0000	kg 10074.2873 / ton 11.1050	NP	NP	NP	NP

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	1.7877E+02	7.4592E+00	NP	NP	NP	(kg)	6.5700E+00
mCi	4.8316E+00	2.0160E-01	NP	NP	NP	(tons)	7.2422E-03

2. MANIFEST NUMBER 9063-10-0002

3. PAGE 1 OF 2 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249354/0110000015	2	3.1432	2531.0456	6.0000E-04	NP	NP	22,28-H	2.8883	100 100	oxide/NP	NP	H-3	2.00000E+01	1.6132E+00	4.3600E-02	AU
												U-Nat [1.4200E+00 kg]	4.60000E+02	3.7000E+01	1.0000E+00	
		111.0000	2.7900	6.0000E-02	NP	NP		102.0000				Subtotal		3.8613E+01	1.0436E+00	
												Total		3.8613E+01	1.0436E+00	
												Source [1.4200E+00 kg]				
Q00249355/0110000015	2	3.1432	2576.4048	6.0000E-04	NP	NP	22,28-H	2.8883	100 100	oxide/NP	NP	H-3	2.00000E+01	1.6465E+00	4.4500E-02	AU
												U-Nat [1.4500E+00 kg]	4.60000E+02	3.7740E+01	1.0200E+00	
		111.0000	2.8400	6.0000E-02	NP	NP		102.0000				Subtotal		3.9387E+01	1.0645E+00	
												Total		3.9387E+01	1.0645E+00	
												Source [1.4500E+00 kg]				
Q00249356/0110000015	2	1.3592	2113.7406	8.0000E-04	NP	NP	22,28-H	1.3592	100 100	oxide/NP	NP	H-3	2.00000E+01	1.3653E+00	3.6900E-02	AU
												U-Nat [1.2000E+00 kg]	4.60000E+02	3.1413E+01	8.4900E-01	
		48.0000	2.3300	8.0000E-02	NP	NP		48.0000				Subtotal		3.2778E+01	8.8590E-01	
												Total		3.2778E+01	8.8590E-01	
												Source [1.2000E+00 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1 Wooden Box or Crate
2 Metal Box
3 Plastic Drum or Pail
4 Metal Drum or Pail
5 Metal Tank or Liner
6 Concrete Tank or Liner
7 Polyethlene Tank or Liner
8 Fiberglass Tank or Liner
9 Demineralizer
10 Gas Cylinder
11 Bulk, Unpackaged Waste
12 Unpackaged Components
13 High Integrity Container
19 Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20 Charcoal
21 Incinerator Ash
22 Soil
23 Gas
24 Oil
25 Aqueous Liquid
26 Filter Media
27 Mechanical Filter
28 EPA or State Hazardous
29 Demolition Rubble
30 Cation Ion-exchange Media
31 Anion Ion-exchange Media
32 Mixed Bed Ion-exchange Media
33 Contaminated Equipment
34 Organic Liquid (except oil)
35 Glassware or Labware
36 Sealed Source/Device
37 Paint or Plating
38 Evaporator Bottoms/Sludges/ Concentrates
39 Compactible Trash
40 Noncompactible Trash
41 Animal Carcass
42 Biological Material (except animal carcass)
43 Activated Material
59 Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification
90 Cement
91 Concrete (encapsulation)
92 Bitumen
93 Vinyl Chloride
94 Vinyl Ester Styrene
99 Other. Describe in item 13, or additional page
100 None Required

FORM 541 (03-06)

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

EnergySolutions, LLC

2. MANIFEST NUMBER 9063-10-0002

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14 CHEMICAL DESCRIPTION		15 RADIOLOGICAL DESCRIPTION				16 WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5 CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3) / (ft3)	8 WASTE AND CONTAINER WEIGHT (kg) / (ton)	9 SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13 SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	
Q00249357/0110000015	2	1.3592	2186.3154	7.0000E-04	NP	NP	22,28-H	1.3592	100 100	oxide/NP	NP	H-3	2.00000E+01	1.4208E+00	3.8400E-02	AU
												U-Nat [1.2500E+00 kg]	4.60000E+02	3.2671E+01	8.8300E-01	
		48.0000	2.4100	7.0000E-02	NP	NP		48.0000				Subtotal		3.4092E+01	9.2140E-01	
												Total		3.4092E+01	9.2140E-01	
												Source [1.2500E+00 kg]				
Q00249358/0110000015	2	1.3592	2177.2435	8.0000E-04	NP	NP	22,28-H	1.3592	100 100	oxide/NP	NP	H-3	2.00000E+01	1.4134E+00	3.8200E-02	AU
												U-Nat [1.2500E+00 kg]	4.60000E+02	3.2486E+01	8.7800E-01	
		48.0000	2.4000	8.0000E-02	NP	NP		48.0000				Subtotal		3.3899E+01	9.1620E-01	
												Total		3.3899E+01	9.1620E-01	
												Source [1.2500E+00 kg]				
Shipment Totals		10.3640	11584.7499									Source [6.5700E+00 kg]		1.7877E+02	4.8316E+00	
		366.0000	12.7700													

FORM 541A (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-10-0002
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	7.4592E+00	2.0160E-01
U-Nat	1.7131E+02	4.6300E+00

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of: 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865089 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (9063-10)	5	CM	25540	P	352		
						F005		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper. This is an exclusive Use Shipment. Load# 9063-10-0002, Ship Doc# L-143010. Container #'s Q00249354, Q00249355, Q00249356, Q00249357, Q00249358.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Kimberly A. Fugmann on behalf of LLNL
Signature: Kimberly A. Fugmann
Month 12 Day 21 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: RONALD LAMESE
Signature:
Month 12 Day 21 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: BKRU026350

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? [✓] YES [ ] NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? [✓] YES [ ] NO
If "Yes," provide Manifest Number ====> EPA MANIFEST NUMBER: 005865050 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-766)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-08-0017
CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

SHIPPER I.D. NUMBER: CA2890012584
[ ] COLLECTOR
[ ] PROCESSOR
[✓] GENERATOR TYPE (Specify) G

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830
CONTACT
TELEPHONE (Include Area Code): 865-482-3896
EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-14-10
SIGNATURE – Authorized carrier acknowledging waste receipt: Melvin Hatter
DATE: 12-14-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0017

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029
CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.
AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-14-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162), Fissile Excepted 1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	2.5734E+02	6.9551E+00	LSA-II	15780 LBS; 678 FT3	Q00249423
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT
1	m3 19.1988	kg 3919.4919
	ft3 678.0000	ton 4.3205

SPECIAL NUCLEAR MATERIAL (grams)

U-233	U-235	Pu	Total
NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0017

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249423/CA2890012584	2	19.1988	7157.6881	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	5.23000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	7.8900	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	3.55000E-01	5.1430E-02	1.3900E-03	
												H-3	3.70000E+02	5.3650E+01	1.4500E+00	
												K-40	1.35000E+03	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	2.07000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	4.37000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	1.01000E-01	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.98000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.19000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.39000E+01	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	3.96000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g] Source [7.1200E-01 kg]				
Shipment Totals		19.1988	7157.6881									SNM [2.9147E-05 g] Source [7.1200E-01 kg]		2.5734E+02	6.9551E+00	
		678.0000	7.8900													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification
90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0017
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865048 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-08)	1	CM	16480	P	352		F005
						D008	F001	F002
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-08-0015, Ship Doc No. L-143832. Container # Q00249424.
Emergency Contact 925-423-4205, Contact Name: LLNL Emergency Dispatch This is An Exclusive Use shipment

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Grahamson behalf of LLNL
Signature:
Month 12 Day 14 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Wade Taylor
Signature:
Month 12 Day 14 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

BLRU 025605

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number: 005685081 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-08-0016

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NBR000013088

SHIPPING DATE: 12-15-10

CONTACT:

TELEPHONE (Include Area Code): 865-483-3896

SIGNATURE – Authorized carrier acknowledging waste receipt:

DATE: 12-15-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0016

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: M11577

DATE: 12/28/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: TITLE: Shipping Coordinator DATE: 12-15-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	16. TOTAL PACKAGE ACTIVITY mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162), Fissile Excepted (1 cm)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	2.5734E+02	6.9551E+00	LSA-II	16420 LBS; 678 FT3	Q00249427

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ___ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-08)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 4001.1386 ton 4.4105	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0016

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER										
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249427/CA2890012584	2	19.1988 678.0000	7447.9872 8.2100	1.0000E-03 1.0000E-01	0.0000E+00 0.0000E+00	NP NP	29-H	19.1988 678.0000	100 100	Oxide/NP	NP	Am-241 Am-243 H-3 K-40 Pu-238 [4.6700E-09 g]	5.12000E-02 3.48000E-01 3.63000E+02 1.32000E+03 2.02000E-02	7.5850E-03 5.1430E-02 5.3650E+01 1.9536E+02 2.9970E-03	2.0500E-04 1.3900E-03 1.4500E+00 5.2800E+00 8.1000E-05	AU
												Pu-239 [2.7300E-05 g] Pu-240 [1.7200E-06 g] Pu-241 [1.1100E-07 g] Pu-242 [1.1700E-08 g]	4.28000E-01 9.88000E-02 2.92000E+00 1.17000E-05	6.3270E-02 1.4652E-02 4.3290E-01 1.7316E-06	1.7100E-03 3.9600E-04 1.1700E-02 4.6800E-08	
												Th-232 [4.9200E-01 kg] U-Nat [2.2000E-01 kg] Subtotal Total	1.36000E-01 3.88000E+01	2.0202E+00 5.7350E+00 2.5734E+02 2.5734E+02	5.4600E-02 1.5500E-01 6.9551E+00 6.9551E+00	
												SNM [2.9147E-05 g] Source [7.1200E-01 kg]				
Shipment Totals		19.1988 678.0000	7447.9872 8.2100									SNM [2.9147E-05 g] Source [7.1200E-01 kg]		2.5734E+02	6.9551E+00	

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0016
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865051 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC — U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-08)	1	CM	16420	P	352		F001
						D008	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-08-0016, Ship Doc # L-143627, Container # Q00249427, Bin # BKRU025605
This is an exclusive use shipment

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL — Signature: Richard B Loden — Month 12 Day 15 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Wes Taylor — Signature — Month 12 Day 15 Year 10
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin BKRQ026057

FORM 540 — **EnergySolutions, LLC**

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER *(Include Area Code)*
925-423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☑ YES
☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865048 JJK

5. SHIPPER -- NAME AND FACILITY
Lawrence Livermore National Laboratory
7000 East Ave
L-786
Livermore, CA 94550

SHIPPER I.D. NUMBER
CA2890012584
☐ COLLECTOR
☐ PROCESSOR

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-08-0015

☑ GENERATOR TYPE *(Specify)* G

CONTACT
Scott A. Graham

TELEPHONE NUMBER (Include Area Code)
925-422-1925

6. CARRIER -- Name and Address
Visionary Solutions LLC
111 Union Valley Road
Suite B
Oak Ridge, Tn 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE

CONTACT
Dispatch

TELEPHONE (Include Area Code)
865-482-3896

SIGNATURE -- *Authorized carrier acknowledging waste receipt*
DATE 12-14-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-08-0015

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE -- *Authorized consignee acknowledging waste receipt*

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE — TITLE: Shipping Coordinator — DATE: 12-14-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7, Fissile Excepted (ERG 162) (1 CM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	2.5734E+02	6.9551E+00	LSA-II	16480 LBS; 678 FT3	Q00249424
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT
1	m3 19.1988	kg 4173.5037
	ft3 678.0000	ton 4.6005

SPECIAL NUCLEAR MATERIAL (grams)

U-233	U-235	Pu	Total
NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0015

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249424/0110000015	2	19.1988	7475.2028	1.0000E-03	0.0000E+00	0.0000E+00	29-H	19.1988	100 100	oxide/NP	NP	Am-241	4.91000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	8.2400	1.0000E-01	0.0000E+00	0.0000E+00		678.0000				Am-243	3.34000E-01	5.1430E-02	1.3900E-03	
												H-3	3.48000E+02	5.3650E+01	1.4500E+00	
												K-40	1.27000E+03	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	1.94000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	4.10000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	9.48000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.80000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.12000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.31000E+01	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	3.72000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g] Source [7.1200E-01 kg]				
Shipment Totals		19.1988	7475.2028									SNM [2.9147E-05 g] Source [7.1200E-01 kg]		2.5734E+02	6.9551E+00	
		678.0000	8.2400													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0015
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865048 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-08)	1	CM	16480	P	352		F005
						D008	F001	F002
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-08-0015, Ship Doc No. L-143832. Container # Q00249424.
Emergency Contact 925-423-4205, Contact Name: LLNL Emergency Dispatch This is An Exclusive Use shipment

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Grahmann on behalf of LLNL
Signature:
Month 12 Day 14 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Wade Taylor
Signature:
Month 12 Day 14 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

GFLU 021107

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 925-423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005865053 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory
7000 East Ave
L-796
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-08-0014

CONTACT: Scott A. Graham

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Road
Suite B
Oak Ridge, Tn 37830

CONTACT: Dispatch

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): Q
TELEPHONE NUMBER (Include Area Code): 925-422-1925
EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12.15.10
TELEPHONE (Include Area Code): 865-482-3896
DATE: 12-15-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0014

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029
M11573

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE: 12/28/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12.15.10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7, Fissile Excepted (ERG 162) (01 CM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	2.5734E+02	6.9551E+00	LSA-II	18700 LBS; 678 FT3	Q00249429
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ___ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1. 12/28/10

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	4872.0360	NP	NP	2.9147E-05 1 Container	2.9147E-05
	ft3	678.0000	ton	5.3705				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0014

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249429/0110000015	2	19.1988	8482.1779	1.0000E-03	0.0000E+00	0.0000E+00	29-H	19.1988	100 100	oxide/NP	NP	Am-241	4.20000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	9.3500	1.0000E-01	0.0000E+00	0.0000E+00		678.0000				Am-243	2.86000E-01	5.1430E-02	1.3900E-03	
												H-3	2.98000E+02	5.3650E+01	1.4500E+00	
												K-40	1.08000E+03	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	1.66000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	3.52000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	8.12000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.40000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	9.60000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.12000E+01	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	3.19000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g]				
												Source [7.1200E-01 kg]				
Shipment Totals		19.1988	8482.1779									SNM [2.9147E-05 g]		2.5734E+02	6.9551E+00	
		678.0000	9.3500									Source [7.1200E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0014
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

CONTACT NAME
LLNL EMERGENCY DISPATCH

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865055 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1923 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-08)	1	CM	18700	P	332 D008	F002	F001 F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-08-0014, Ship Doc No. L-143640. Container # Q00249429. Bin# GFLU001107.
This is an Exclusive Use Shipment.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Graham on behalf of LLNL
Signature:
Month 12 Day 15 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Ward Taylor
Signature:
Month 12 Day 15 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

GENERATOR

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bn# BKRU025644

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 925-423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER: 005863057 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory
7000 East Ave
L-795
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-08-0013

CONTACT: Scott A. Graham
TELEPHONE NUMBER (Include Area Code): 925-422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Road
Suite B
Oak Ridge, Tn 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-15-10

CONTACT: Dispatch
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]
DATE: 12-15-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0013

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029 M11570

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]
DATE: 12/28/10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature]
TITLE: Shipping Coordinator
DATE: 12-15-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7, Fissile Excepted (ERG 162) (01 CM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	2.5734E+02	6.9551E+00	LSA-II	17820 LBS; 678 FT3	Q00249425
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ___ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 / ft3 678.0000	kg 4772.2456 / ton 5.2605	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0013

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249425/0110000015	2	19.1988	8083.0166	1.0000E-03	0.0000E+00	0.0000E+00	29-H	19.1988	100 100	oxide/NP	NP	Am-241	4.29000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	8.9100	1.0000E-01	0.0000E+00	0.0000E+00		678.0000				Am-243	2.92000E-01	5.1430E-02	1.3900E-03	
												H-3	3.04000E+02	5.3650E+01	1.4500E+00	
												K-40	1.11000E+03	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	1.70000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	3.59000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	8.29000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.45000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	9.80000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.14000E+01	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	3.25000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g] Source [7.1200E-01 kg]				
Shipment Totals		19.1988	8083.0166									SNM [2.9147E-05 g] Source [7.1200E-01 kg]		2.5734E+02	6.9551E+00	
		678.0000	8.9100													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0013
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

Contact Name:
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of: 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865057 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-08)	1	CM	17820	P	352	F001	
						D008	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-08-0013, Ship Doc No. L-143852. Container # Q00249425, Bin # BKRU 025844
This is an exclusive Use Shipment.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Graham on behalf of LLNL
Signature:
Month 12 Day 15 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Wade Taylor
Signature:
Month 12 Day 15 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: BKRU026203

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4208, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number: EPA MANIFEST NUMBER: 005885052 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-08-0012

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1929

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NBR000011296
SHIPPING DATE: 12-15-10
TELEPHONE (Include Area Code): 865-482-3796

CONTACT:
SIGNATURE – Authorized carrier acknowledging waste receipt:
DATE: 12-15-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0012

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029
M 115568

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt:
DATE: 12/28/2010

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: TITLE: Shipping Coordinator DATE: 12-15-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162), Fissile Excepted (1 CM)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	2.6776E+02	6.9661E+00	NA	16420 LBS; 678 FT3	Q00249426

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ___ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1. # 12/28/10

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 4255.1503 ton 4.6905	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0012

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249426/CA2890012584	2	19.1988	7447.9872	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	4.81000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	8.2100	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	3.27000E-01	5.1430E-02	1.3900E-03	
												H-3	3.41000E+02	5.3650E+01	1.4500E+00	
												K-40	1.24000E+03	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	1.90000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	4.03000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	9.29000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.74000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.10000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.28000E+01	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	3.65000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g] Source [7.1200E-01 kg]				
Shipment Totals		19.1988 678.0000	7447.9872 8.2100									SNM [2.9147E-05 g] Source [7.1200E-01 kg]		2.5734E+02	6.9551E+00	

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0012
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865052 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-08)	1	CM	16420	P	352 D008	F002	F001 F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking purposes only. See NRC Form 540 for DOT shipping paper.
Load # 9063-08-0012, Ship Doc # L-143853, Container # Q00249426, Bin # BKRU026203

EXCLUSIVE USE SHIPMENT

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 15 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Transporter signature (for exports only):
Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Ron Wade Taylor
Signature:
Month 12 Day 15 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin# BKRU025651

FORM 540 — **EnergySolutions, LLC**

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? [✓] YES [ ] NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? [✓] YES [ ] NO
If "Yes," provide Manifest Number =====> EPA MANIFEST NUMBER: 005865046 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
[ ] COLLECTOR
[ ] PROCESSOR
[✓] GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-08-0011

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-14-10
CONTACT
TELEPHONE (Include Area Code): 865-482-3896
SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 12-14-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0011

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155
SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-14-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162), Fissile Excepted (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	2.5734E+02	6.9551E+00	LSA-II	16980 LBS; 678 FT3	Q00249428
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY
____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	4336.7969	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	4.7805			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0011

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249428/CA2890012584	2	19.1988	7701.9990	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	4.72000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	8.4900	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	3.21000E-01	5.1430E-02	1.3900E-03	
												H-3	3.35000E+02	5.3650E+01	1.4500E+00	
												K-40	1.22000E+03	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	1.87000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	3.95000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	9.12000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.69000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.08000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.26000E+01	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	3.58000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g] Source [7.1200E-01 kg]				
Shipment Totals		19.1988	7701.9990									SNM [2.9147E-05 g] Source [7.1200E-01 kg]		2.5734E+02	6.9551E+00	
		678.0000	8.4900													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0011
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865046 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 [ERG 162] (9063-08)	1	CM	16980	P	352 / D008	/ F002	Fod / F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-08-0011, Ship Doc # L-143615, Container # Q00249428
This is an exclusive use shipment. Bin BKRU025651

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 14 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Wade Taylor
Signature:
Month 12 Day 14 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: BKRU26033

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ====> EPA MANIFEST NUMBER: 005865041 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-08-0010

CONTACT: Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: NMR000013086

SHIPPING DATE: 12-13-10

TELEPHONE (Include Area Code): 865-482-3896

DATE: 12-13-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0010

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: Richard B Loden
TITLE: SHIPPING COORDINATOR
DATE: 12-13-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162), Fissile Excepted (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	2.5734E+02	6.9551E+00	NA	22340 LBS; 678 FT3	Q00249430
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988	kg 6795.2677	NP	NP	2.9147E-05	2.9147E-05
	ft3 678.0000	ton 7.4905			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0010

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249430/CA2890012584	2	19.1988	10133.2542	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	3.01000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	11.1700	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	2.05000E-01	5.1430E-02	1.3900E-03	
												H-3	2.14000E+02	5.3650E+01	1.4500E+00	
												K-40	7.78000E+02	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	1.19000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	2.52000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	5.82000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.72000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	6.88000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	8.03000E+00	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	2.29000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g] Source [7.1200E-01 kg]				
Shipment Totals		19.1988	10133.2542									SNM [2.9147E-05 g] Source [7.1200E-01 kg]		2.5734E+02	6.9551E+00	
		678.0000	11.1700													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0010
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865041 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-08)	1	CM	22340	P	332 D008	F002	F001 F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Load # 9063-08-0010, Ship Doc # L-143586, Container # Q00249430.
This is an exclusive use shipment.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: RICHARD B LODEN ON BEHALF OF LLNL
Signature: Richard B Loden
Month 12 Day 13 Year 10

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: [illegible]
Signature: Wasi Taylor
Month 12 Day 13 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU000178

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ==== > 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ====> EPA MANIFEST NUMBER: 005865039 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-756)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-08-0009

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-13-10
CONTACT
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]
DATE: 12-13-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0009

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/13/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Waste, UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162), Fissile Excepted (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	2.5734E+02	6.9551E+00	LSA-II	17100 LBS; 678 FT3	Q00249433
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 4091.8570 ton 4.5105	NP	NP	2.9147E-05 1 Container	2.9147E-05

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0009

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249433/CA2890012584	2	19.1988	7756.4300	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	5.00000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	8.5500	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	3.40000E-01	5.1430E-02	1.3900E-03	
												H-3	3.55000E+02	5.3650E+01	1.4500E+00	
												K-40	1.29000E+03	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	1.98000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	4.19000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	9.67000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.85000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.14000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.33000E+01	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	3.80000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g]				
												Source [7.1200E-01 kg]				
Shipment Totals		19.1988	7756.4300									SNM [2.9147E-05 g]		2.5734E+02	6.9551E+00	
		678.0000	8.5500									Source [7.1200E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0009
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865039 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-785
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (fissile excepted) [ERG 162] (9063-08)	1	CM	17100	P	352		F001
						D008	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
Thia is an exclusive use shipment.
Load # 9063-08-0009, Ship Doc # L-143583, Container # Q00249433.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A. Graham on behalf LLNL
Signature
Month 12 Day 13 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Wade Taylor
Signature
Month 12 Day 13 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin Number: GFLU000262

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☑ YES
☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER
005865038 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-08-0008

CONTACT
Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER
CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE
12/13/10

TELEPHONE (Include Area Code)
865-482-3896

DATE
12-13-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-08-0008

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE

TITLE
Shipping Coordinator

DATE
12/13/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	16. TOTAL PACKAGE ACTIVITY mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Waste, UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162), Fissile Excepted (1 CM)	NA	NA	Solid Oxide	Am-241, Am-243, H-3, K-40, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Th-232, U-Nat	2.5734E+02	6.9551E+00	LSA-II	22440 LBS; 678 FT3	Q00249432

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	5552.4246	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	6.1205			1 Container	

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0008

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249432/CA2890012584	2	19.1988	10178.6135	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100	Oxide/NP	NP	Am-241	3.17000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	11.2200	1.0000E-01	0.0000E+00	NP		678.0000	100			Am-243	2.16000E-01	5.1430E-02	1.3900E-03	
												H-3	2.25000E+02	5.3650E+01	1.4500E+00	
												K-40	8.18000E+02	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	1.25000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	2.65000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	6.12000E-02	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	1.81000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	7.24000E-06	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	8.45000E+00	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	2.40000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g]				
												Source [7.1200E-01 kg]				
Shipment Totals		19.1988	10178.6135									SNM [2.9147E-05 g]		2.5734E+02	6.9551E+00	
		678.0000	11.2200									Source [7.1200E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0008
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

CONTACT NAME
LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865038 JJK

GENERATOR

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC — U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-10) OS AR	1	CM	22440	P	352		F001
						D008	F002	F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.
This is an exclusive use shipment.
Load # 9063-08-0008, Ship Doc # L-143584, Container # Q00249432.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Scott A Graham on behalf of LLNL — Signature: [signature] — Month 12 Day 13 Year 10

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Waco Taylor — Signature: [signature] — Month 12 Day 13 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Bin #GFLW001143

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number =====>
EPA MANIFEST NUMBER
005865029 JJK

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No. 0110000015
SHIPMENT NUMBER 9063-08-0007

CONTACT
Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G
TELEPHONE NUMBER (Include Area Code) (925) 422-1925
EPA I.D. NUMBER NMR000013086
SHIPPING DATE 12/9/10
TELEPHONE (Include Area Code) 865-482-3896
DATE 12-9-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-08-0007

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance
TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE

TITLE Shipping Coordinator

DATE 12/9/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
UN3321, Waste Radioactive Material Low Specific Activity (LSA-II), 7, (ERG Nr 162), Fissile Excepted (1 CM)	NA	NA	Solid Oxide	Am-241	Am-243	H-3	K-40	2.5734E+02	6.9551E+00	LSA-II	15740 LBS; 678 FT3	Q00249422
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	3946.7075	NP	NP	2.9147E-05	2.9147E-05
	ft3	678.0000	ton	4.3505			1 Container	

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.5734E+02	5.3650E+01	NP	NP	NP	(kg)	7.1200E-01
mCi	6.9551E+00	1.4500E+00	NP	NP	NP	(tons)	7.8485E-04

2. MANIFEST NUMBER 9063-08-0007

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249422/CA2890012584	2	19.1988	7139.5444	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	Am-241	5.19000E-02	7.5850E-03	2.0500E-04	AU
		678.0000	7.8700	1.0000E-01	0.0000E+00	NP		678.0000				Am-243	3.53000E-01	5.1430E-02	1.3900E-03	
												H-3	3.68000E+02	5.3650E+01	1.4500E+00	
												K-40	1.34000E+03	1.9536E+02	5.2800E+00	
												Pu-238 [4.6700E-09 g]	2.05000E-02	2.9970E-03	8.1000E-05	
												Pu-239 [2.7300E-05 g]	4.34000E-01	6.3270E-02	1.7100E-03	
												Pu-240 [1.7200E-06 g]	1.00000E-01	1.4652E-02	3.9600E-04	
												Pu-241 [1.1100E-07 g]	2.96000E+00	4.3290E-01	1.1700E-02	
												Pu-242 [1.1700E-08 g]	1.18000E-05	1.7316E-06	4.6800E-08	
												Th-232 [4.9200E-01 kg]	1.38000E+01	2.0202E+00	5.4600E-02	
												U-Nat [2.2000E-01 kg]	3.93000E+01	5.7350E+00	1.5500E-01	
												Subtotal		2.5734E+02	6.9551E+00	
												Total		2.5734E+02	6.9551E+00	
												SNM [2.9147E-05 g]				
												Source [7.1200E-01 kg]				
Shipment Totals		19.1988	7139.5444									SNM [2.9147E-05 g]		2.5734E+02	6.9551E+00	
		678.0000	7.8700									Source [7.1200E-01 kg]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0007
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	7.5850E-03	2.0500E-04
Am-243	5.1430E-02	1.3900E-03
H-3	5.3650E+01	1.4500E+00
K-40	1.9536E+02	5.2800E+00
Pu-238	2.9970E-03	8.1000E-05
Pu-239	6.3270E-02	1.7100E-03
Pu-240	1.4652E-02	3.9600E-04
Pu-241	4.3290E-01	1.1700E-02
Pu-242	1.7316E-06	4.6800E-08
Th-232	2.0202E+00	5.4600E-02
U-Nat	5.7350E+00	1.5500E-01

Contact Name

LLNL EMERGENCY DISPATCH

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of: 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865029 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1923 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (9063-~~10~~ 08) RQ	1	CM	15740	P	352	F001	F002
						D008		F005
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for CA EPA tracking only. See NRC Form 540 for DOT shipping paper.☐
This is an exclusive use shipment.☐
Load # 9063-08-0007, Ship Doc No L-143437 Bin# GFLU001143

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: SCOTT A. GRAHAM ~~Richard P. Loden~~ on behalf of LLNL
Signature:
Month 12 Day 09 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Waco Taylor
Signature:
Month 12 Day 09 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 3

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☑ YES ☐ NO
If "Yes," provide Manifest Number ==>>>>> 005885023JJK

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-788)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015

SHIPMENT NUMBER: 9063-08-0005

CONTACT: Kimberly A. Fugmann

6. CARRIER – Name and Address
Visionary Solutions
111 Union Valley Road Suite B
Oak Ridge, TN 37830

CONTACT: Dispatch

SIGNATURE – Authorized carrier acknowledging waste receipt: Michael Hunter

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): (925) 422-1928

EPA I.D. NUMBER: NMR000013088

SHIPPING DATE

TELEPHONE (Include Area Code): 865-482-3896

DATE: 1-4-2011

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 2 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0005

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Treatment Facility)
Interstate 80, Exit 49
Clive, UT 84029
M 11590

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE: 1-5-11

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: Kim Agnew

TITLE: Shipping Coordinator

DATE: 1-4-11

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 DM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	8.1949E-01	2.2148E-02	NA	183 LBS; 8 FT3	Q00248127
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						
NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 DM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	1.3601E+00	3.6760E-02	NA	230 LBS; 8 FT3	Q00248134
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						
NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (01 DM)	NA	NA	solid oxide	Am-241	Am-243	H-3	K-40	5.1223E-01	1.3844E-02	NA	251 LBS; 8 FT3	Q00249928
				Pu-238	Pu-239	Pu-240	Pu-241					
				Pu-242	Th-232	U-Nat						

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material ✓ is (or) ___ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-05)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
3	m3	0.5946	kg	209.1061	NP	NP	4.3138E-07 3 Containers	4.3138E-07
	ft3	21.0000	ton	0.2305				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	2.6918E+00	7.9587E-01	NP	NP	NP	(kg)	1.0074E-02
mCi	7.2752E-02	2.1510E-02	NP	NP	NP	(tons)	1.1105E-05

2. MANIFEST NUMBER 9063-08-0005

3. PAGE 1 OF 2 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3) (ft3)	8 WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10 SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
												RADIONUCLIDES	pCi/gm	MBq	mCi	
Q00248127/0110000015	4	0.2265	73.9356	3.0000E-04	NP	NP	29,28-H	0.1982	100 100	oxide/NP	NP	Am-241	1.41000E-02	2.4161E-05	6.5300E-07	AU
		8.0000	0.0815	3.0000E-02	NP	NP		7.0000				Am-243	9.60000E-02	1.6428E-04	4.4400E-06	
												H-3	1.00000E+02	1.7131E-01	4.6300E-03	
												K-40	3.64000E+02	6.2160E-01	1.6800E-02	
												Pu-238 [1.4900E-11 g]	5.58000E-03	9.5460E-06	2.5800E-07	
												Pu-239 [8.7000E-08 g]	1.18000E-01	2.0202E-04	5.4600E-06	
												Pu-240 [5.4900E-09 g]	2.73000E-02	4.6620E-05	1.2600E-06	
												Pu-241 [3.5500E-10 g]	8.05000E-01	1.3764E-03	3.7200E-05	
												Pu-242 [3.7200E-11 g]	3.22000E-06	5.5130E-09	1.4900E-10	
												Th-232 [1.5700E-03 kg]	3.76000E+00	6.4380E-03	1.7400E-04	
												U-Nat [7.0200E-04 kg]	1.07000E+01	1.8315E-02	4.9500E-04	
												Subtotal		8.1949E-01	2.2148E-02	
												Total		8.1949E-01	2.2148E-02	
												SNM [9.2897E-08 g]				
												Source [2.2720E-03 kg]				
Q00248134/0110000015	4	0.2265	104.3263	2.0000E-04	NP	NP	29,28-H	0.1982	100 100	oxide/NP	NP	Am-241	1.41000E-02	3.9960E-05	1.0800E-06	AU
		8.0000	0.1150	2.0000E-02	NP	NP		7.0000				Am-243	9.60000E-02	2.7232E-04	7.3600E-06	
												H-3	1.00000E+02	2.8379E-01	7.6700E-03	
												K-40	3.64000E+02	1.0323E+00	2.7900E-02	
												Pu-238 [2.4700E-11 g]	5.58000E-03	1.5836E-05	4.2800E-07	
												Pu-239 [1.4400E-07 g]	1.18000E-01	3.3485E-04	9.0500E-06	
												Pu-240 [9.1000E-09 g]	2.73000E-02	7.7330E-05	2.0900E-06	
												Pu-241 [5.8800E-10 g]	8.05000E-01	2.2829E-03	6.1700E-05	
												Pu-242 [6.1700E-11 g]	3.22000E-06	9.1390E-09	2.4700E-10	

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1 Wooden Box or Crate
2. Metal Box
3 Plastic Drum or Pail
4 Metal Drum or Pail
5 Metal Tank or Liner
6. Concrete Tank or Liner
7 Polyethlene Tank or Liner
8 Fiberglass Tank or Liner
9 Demineralizer
10 Gas Cylinder
11 Bulk, Unpackaged Waste
12 Unpackaged Components
13 High Integrity Container
19 Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23 Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34 Organic Liquid (except oil)
35 Glassware or Labware
36 Sealed Source/Device
37. Paint or Plating
38 Evaporator Bottoms/Sludges/ Concentrates
39 Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43 Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification
90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

EnergySolutions, LLC

2. MANIFEST NUMBER 9063-08-0005

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15. RADIOLOGICAL DESCRIPTION				
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT				16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
												RADIONUCLIDES	pCi/gm	MBq	mCi	
												Th-232 [2.6000E-03 kg]	3.76000E+00	1.0656E-02	2.8800E-04	
												U-Nat [1.1600E-03 kg]	1.07000E+01	3.0340E-02	8.2000E-04	
												Subtotal		1.3601E+00	3.6760E-02	
												Total		1.3601E+00	3.6760E-02	
												SNM [1.5377E-07 g]				
												Source [3.7600E-03 kg]				
Q00249928/0110000015	4	0.2265	113.8517	4.0000E-04	NP	NP	29,28-H	0.1982	100 100	oxide/NP	NP	Am-241	1.51000E-02	4.8100E-05	1.3000E-06	AU
		8.0000	0.1255	4.0000E-02	NP	NP		7.0000				Am-243	1.03000E-01	3.2708E-04	8.8400E-06	
												H-3	1.07000E+02	3.4077E-01	9.2100E-03	
												K-40	4.10000E+01	1.3098E-01	3.5400E-03	
												Pu-238 [2.9600E-11 g]	5.96000E-03	1.9018E-05	5.1400E-07	
												Pu-239 [1.7300E-07 g]	1.26000E-01	4.0330E-04	1.0900E-05	
												Pu-240 [1.0900E-08 g]	2.91000E-02	9.2870E-05	2.5100E-06	
												Pu-241 [7.0600E-10 g]	8.60000E-01	2.7417E-03	7.4100E-05	
												Pu-242 [7.4100E-11 g]	3.44000E-06	1.0989E-08	2.9700E-10	
												Th-232 [3.1200E-03 kg]	4.02000E+00	1.2802E-02	3.4600E-04	
												U-Nat [9.2200E-04 kg]	7.54000E+00	2.4050E-02	6.5000E-04	
												Subtotal		5.1223E-01	1.3844E-02	
												Total		5.1223E-01	1.3844E-02	
												SNM [1.8471E-07 g]				
												Source [4.0420E-03 kg]				
Shipment Totals		0.6795	292.1136									SNM [4.3138E-07 g]		2.6918E+00	7.2752E-02	
		24.0000	0.3220									Source [1.0074E-02 kg]				

FORM 541A (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-08-0005
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
Am-241	1.1222E-04	3.0330E-06
Am-243	7.6368E-04	2.0640E-05
H-3	7.9587E-01	2.1510E-02
K-40	1.7849E+00	4.8240E-02
Pu-238	4.4400E-05	1.2000E-06
Pu-239	9.4017E-04	2.5410E-05
Pu-240	2.1682E-04	5.8600E-06
Pu-241	6.4010E-03	1.7300E-04
Pu-242	2.5641E-08	6.9300E-10
Th-232	2.9896E-02	8.0800E-04
U-Nat	7.2705E-02	1.9650E-03

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865023 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory For The US DOE
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: Visionary Solutions LLC
U.S. EPA ID Number: NMR000013086

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EnergySolutions LLC
Interstate-80, Exit 49
Clive UT 84029
Facility's Phone: 435-884-0155
U.S. EPA ID Number: UTD982598898

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-08)	1	DM	163	P	181	F002	D008
						F001	F005	
	2. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-08)	1	DM	251	P	352	F002	D008
						F001	F005	
	3. NA3077, Hazardous waste, solid, n.o.s. (F001, F002), 9, III [ERG 171] (9063-08)	1	DM	230	P	352	F002	D008
						F001	F005	
	4.							

14. Special Handling Instructions and Additional Information
Load #9063-08-0005, Ship Doc No. L-143234, Container # Q00248127, Q00248134 (Line 3) Line 1
Q00249928 ~~(Line 3)~~ (Line 2) - Registrant Name: LLNL Emergency Dispatch.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Kimberly A. Fugmann on behalf of LLNL
Signature: [signature]
Month 1 Day 4 Year 11

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Hunter
Signature: Michael Hunter
Month 1 Day 4 Year 11
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

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FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 925-423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number ——>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory
7000 East Ave
L-786
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-08-0035
☑ GENERATOR TYPE (Specify): G

CONTACT: Scott A. Graham
TELEPHONE NUMBER (Include Area Code): 925-422-1825

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Road
Suite B
Oak Ridge, Tn 37830

EPA I.D. NUMBER: NMR000013068
SHIPPING DATE: 12-21-10

CONTACT: Dispatch
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]
DATE: 12-21-2010

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-08-0035

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site
Interstate 80, Exit 49
Clive, UT 84029
(Bulk Waste Facility) L115477

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt: [signature]
DATE: 12-22-10

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/21/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non regulated waste, solid (demolition debris) (01 CM)	NA	NA	solid oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	13040 LBS; 678 FT3	Q00249442

FOR CONSIGNEE USE ONLY

___ Record Waste Description Inadequate
___ Contamination or Leakage Detected
___ Unexpected Exposure Rates Detected
___ Labels, Markings, etc. Inadequate
___ Container Integrity Inadequate
___ Other
✓ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	2477.0681	NP	NP	NP	NP
	ft3	678.0000	ton	2.7305				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0035

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249442/0110000015	2	19.1988	5914.8449	1.0000E-03	0.0000E+00	NP	29-HI	19.1988	100 100	oxide/NP	NP	H-3	7.32000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	6.5200	1.0000E-01	0.0000E+00	NP		678.0000				K-40	2.81000E+02	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	1.66000E+01	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	2.15000E+01	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	5914.8449									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	6.5200													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0035
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

Bin Number: COLO000115

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ==== > 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number ======>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-06-0034

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12/16/10

CONTACT
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 12-16-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0034

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/16/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
				H-3	K-40	Th-232	U-Nat					
Non-Regulated Waste Solid (demolition debris), (1 CM)	NA	NA	Solid Oxide					9.6248E+01	2.6013E+00	NA	41180 LBS; 678 FT3	Q00249400

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	14896.4280	NP	NP	NP	NP
	ft3	678.0000	ton	16.4205				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0034

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249400/CA2890012584	2	19.1988	18678.9350	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100	Oxide/NP	NP	H-3	1.22000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	20.5900	1.0000E-01	0.0000E+00	NP		678.0000	100			K-40	4.68000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	2.75000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	3.58000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	18678.9350									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	20.5900													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0034
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

Bin Number: GFLU000192

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015

SHIPMENT NUMBER: 9063-06-0033

CONTACT: Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: NMR000013086

SHIPPING DATE: 12-15-10

TELEPHONE (Include Area Code): 865-482-3896

DATE: 12-15-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0033

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-15-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Waste Solid (demolition debris), (1 CM)	NA	NA	Solid Oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	32940 LBS; 678 FT3	Q00249411

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988	kg 11258.6170	NP	NP	NP	NP
	ft3 678.0000	ton 12.4105				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0033

3. PAGE 1 **OF** 1 **PAGE(S)**

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (F > 0.1%)	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249411/CA2890012584	2	19.1988	14941.3337	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	H-3	1.61000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	16.4700	1.0000E-01	0.0000E+00	NP		678.0000				K-40	6.19000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	3.64000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	4.74000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	14941.3337									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	16.4700													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

Bin Number: BKRU26030

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-06-0032

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-16-10

CONTACT
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 12-16-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0032

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/16/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES		16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Waste Solid (demolition debris), (1 CM)	NA	NA	Solid Oxide	H-3 K-40	Th-232 U-Nat	9.6248E+01	2.6013E+00	NA	41959 LBS; 678 FT3	Q00249404

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT
1	m3 19.1988 ft3 678.0000	kg 15757.8000 ton 17.3700

SPECIAL NUCLEAR MATERIAL (grams)

U-233	U-235	Pu	Total
NP	NP	NP	NP

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0032

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249404/CA2890012584	2	19.1988	19032.2835	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	H-3	1.15000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	20.9795	1.0000E-01	0.0000E+00	NP		678.0000				K-40	4.42000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	2.60000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	3.38000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	19032.2835									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	20.9795													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0032
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

Bin Number: BKRU026384

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Ave.
Livermore, Ca 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-06-0031

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): 925-422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-14-10

CONTACT
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 12-14-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0031

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-14-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Waste Solid (demolition debris)	NA	NA	Solid Oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	29520 LBS; 678 FT3	Q00249417

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 ft3 678.0000	kg 10079.2767 ton 11.1105	NP	NP	NP	NP

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0031

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (IF > 0.1%)	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249417/CA2890012584	2	19.1988	13390.0476	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	H-3	1.80000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	14.7600	1.0000E-01	0.0000E+00	NP		678.0000				K-40	6.91000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	4.07000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	5.29000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	13390.0476									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	14.7600													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0031
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

Bin #GFLU00047

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number =====> EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-06-0030

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12-14-10

CONTACT:
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
DATE: 12-14-2010

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0030

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt
DATE:

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12-14-10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES		16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Material solid (demolition debris), 1 cm	NA	NA	Solid Oxide	H-3 K-40	Th-232 U-Nat	9.6248E+01	2.6013E+00	NA	38920 LBS; 678 FT3	Q00249415

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988	kg 14007.3869	NP	NP	NP	NP
	ft3 678.0000	ton 15.4405				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0030

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3)/(ft3)	8. WASTE AND CONTAINER WEIGHT (kg)/(ton)	9. SURFACE RADIATION LEVEL (mSv/hr)/(mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2)/(dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3)/(FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249415/CA2890012584	2	19.1988	17653.8162	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100	Oxide/NP	NP	H-3	1.30000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	19.4600	1.0000E-01	0.0000E+00	NP		678.0000	100			K-40	4.97000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	2.93000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	3.81000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	17653.8162									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	19.4600													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0030
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584

☐ COLLECTOR
☐ PROCESSOR

Utah Generator Site Access Permit No.: 0110000015

SHIPMENT NUMBER

☑ GENERATOR TYPE (Specify) G

CONTACT: Rich Loden

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086

SHIPPING DATE: 12/9/10

CONTACT

TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt: Michael Hurts

DATE: 12-9-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0029

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/9/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Material Solid (demolition debris) 1 CM	NA	NA	Solid Oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	38160 LBS; 678 FT3	Q00249414
												BKRU 0026417

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 / ft3 678.0000	kg 13934.8121 / ton 15.3605	NP	NP	NP	NP

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0029

3. PAGE 1 **OF** 1 **PAGE(S)**

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER									
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249414/CA2890012584	2	19.1988	17309.0860	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	H-3	1.30000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	19.0800	1.0000E-01	0.0000E+00	NP		678.0000				K-40	5.00000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	2.94000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	3.83000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	17309.0860									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	19.0800													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0029
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT?
☐ YES
☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER -- NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER
CA2890012584
☐ COLLECTOR
☐ PROCESSOR

Utah Generator Site Access Permit No.
0110000015

SHIPMENT NUMBER
9063-06-0028

☑ GENERATOR TYPE
(Specify) G

CONTACT
Rich Loden

TELEPHONE NUMBER
(Include Area Code)
(925) 422-1925

6. CARRIER -- Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE
12/8/10

CONTACT

TELEPHONE
(Include Area Code)
865-482-3896

SIGNATURE -- Authorized carrier acknowledging waste receipt

DATE
12-8-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER
(Use this number on all continuation pages)
9063-06-0028

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE
(Include Area Code)
(435)884-0155

SIGNATURE -- Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE

TITLE
Shipping Coordinator

DATE
12/8/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Material Solid (demolition debris), 1 CM	NA	NA	Solid Oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	33739 LBS; 678 FT3	Q00248119

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	11866.4308	NP	NP	NP	NP
	ft3	678.0000	ton	13.0805				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0028

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME
Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER
CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00248119/CA2890012584	2	19.1988	15303.7540	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100	Oxide/NP	NP	H-3	1.53000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	16.8695	1.0000E-01	0.0000E+00	NP		678.0000	100			K-40	5.87000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	3.46000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	4.49000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	15303.7540									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	16.8695													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0028
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

FORM 540 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Ave.
Livermore, Ca 94550

SHIPPER I.D. NUMBER
CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No. 0110000015

SHIPMENT NUMBER 9063-06-0027

CONTACT
Rich Loden

TELEPHONE NUMBER (Include Area Code)
925-422-1925

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE

CONTACT

TELEPHONE (Include Area Code)
865-482-3896

SIGNATURE – Authorized carrier acknowledging waste receipt
Michael Hunter

DATE
12-8-2010

7. FORM 540 AND 540A PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A 1 PAGE(S)
FORM 542 AND 542A None PAGE(S)
ADDITIONAL INFORMATION None PAGE(S)

8. MANIFEST NUMBER
(Use this number on all continuation pages)
9063-06-0027

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE
TITLE Shipping Coordinator
DATE 12/8/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Material Solid (demolition debris), 1 CM	NA	NA	Solid Oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	33480 LBS; 678 FT3	Q00249413

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988	kg 11884.5745	NP	NP	NP	NP
	ft3 678.0000	ton 13.1005				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0027

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249413/CA2890012584	2	19.1988	15186.2736	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100	Oxide/NP	NP	H-3	1.53000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	16.7400	1.0000E-01	0.0000E+00	NP		678.0000	100			K-40	5.86000E-01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	3.45000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	4.49000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	15186.2736									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	16.7400													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER -- NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No. 0110000015
SHIPMENT NUMBER 9063-06-0026

CONTACT Rich Loden
TELEPHONE NUMBER (Include Area Code) (925) 422-1925

6. CARRIER -- Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER NMR000013086
SHIPPING DATE 12/4/10

CONTACT
TELEPHONE (Include Area Code) 865-482-3896

SIGNATURE -- Authorized carrier acknowledging waste receipt
DATE 12-9-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages)
9063-06-0026

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT Transportation Compliance
TELEPHONE (Include Area Code) (435)884-0155

SIGNATURE -- Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE
TITLE Shipping Coordinator
DATE 12/4/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Material Solid (demolition debris), 1 CM	NA	NA	Solid Oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	35820 LBS; 678 FT3	Q00249412
												BKRU 026304

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	12964.1244	NP	NP	NP	NP
	ft3	678.0000	ton	14.2905				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0026

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249412/CA2890012584	2	19.1988	16247.6798	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	H-3	1.40000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	17.9100	1.0000E-01	0.0000E+00	NP		678.0000				K-40	5.37000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	3.16000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	4.11000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	16247.6798									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	17.9100													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ==>> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number ==>>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-06-0025

CONTACT: Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

TELEPHONE NUMBER (Include Area Code): (925) 422-1925

EPA I.D. NUMBER: NMR000013086

SHIPPING DATE: 12/8/10

TELEPHONE (Include Area Code): 865-482-3896

DATE: 12-8-10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0025

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: TITLE: Shipping Coordinator DATE: 12/8/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Material Solid (demolition debris), 1 CM	NA	NA	Solid Oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	33900 LBS; 678 FT3	Q00249408

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3 19.1988 / ft3 678.0000	kg 11594.2753 / ton 12.7805	NP	NP	NP	NP

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0025

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249408/CA2890012584	2	19.1988	15376.7824	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	H-3	1.56000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	16.9500	1.0000E-01	0.0000E+00	NP		678.0000				K-40	6.01000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	3.54000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	4.60000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	15376.7824									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	16.9500													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6; or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0025
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 925-423-4205 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER -- NAME AND FACILITY
Lawrence Livermore National Laboratory
7000 East Ave
L-786
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-06-0024

CONTACT: Scott A. Graham
TELEPHONE NUMBER (Include Area Code): 925-422-1925

6. CARRIER -- Name and Address
Visionary Solutions LLC
111 Union Valley Road
Suite B
Oak Ridge, Tn 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12/8/10

CONTACT: Dispatch
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE -- Authorized carrier acknowledging waste receipt: Michael Hunter
DATE: 12-8-2010

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0024

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE -- Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: Shipping Coordinator DATE: 12/8/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non regulated waste, solid (demolition debris) (1 CM)	NA	NA	solid oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	32820 LBS; 678 FT3	Q00249402

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT
1	m3 19.1988	kg 11140.6829
	ft3 678.0000	ton 12.2805

SPECIAL NUCLEAR MATERIAL (grams)			
U-233	U-235	Pu	Total
NP	NP	NP	NP

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0024

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249402/0110000015	2	19.1988	14886.9026	1.0000E-03	0.0000E+00	0.0000E+00	29-HI	19.1988	100 100	oxide/NP	NP	H-3	1.63000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	16.4100	1.0000E-01	0.0000E+00	0.0000E+00		678.0000				K-40	6.25000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	3.68000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	4.79000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	14886.9026									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	16.4100													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT?
☐ YES
☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

Utah Generator Site Access Permit No. 0110000015

SHIPMENT NUMBER 9063-06-0023

CONTACT
Rich Loden

6. CARRIER – Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

CONTACT
DISPATCH

SIGNATURE – Authorized carrier acknowledging waste receipt

SHIPPER I.D. NUMBER
CA2890012584

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE
(Specify) G

TELEPHONE NUMBER (Include Area Code)
(925) 422-1925

EPA I.D. NUMBER
NMR000013086

SHIPPING DATE
12/7/10

TELEPHONE (Include Area Code)
865-482-3896

DATE
12/7/2010

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER
(Use this number on all continuation pages)
9063-06-0023

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT
Transportation Compliance

TELEPHONE (Include Area Code)
(435)884-0155

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE

TITLE Shipping Coordinator

DATE 12/7/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Material Solid (demolition debris), 1 CM	NA	NA	Solid Oxide	H-3	K-40	Th-232	U-Nat	9.6248E+01	2.6013E+00	NA	29320 LBS; 678 FT3	Q00249401

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	9589.3969	NP	NP	NP	NP
	ft3	678.0000	ton	10.5705				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0023

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249401/CA2890012584	2	19.1988	13299.3292	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	H-3	1.89000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	14.6600	1.0000E-01	0.0000E+00	NP		678.0000				K-40	7.27000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	4.28000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	5.56000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	13299.3292									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	14.6600													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0023
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): (925) 423-4205, Contact Name: LLNL Emergency Dispatch

ORGANIZATION: Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☐ YES ☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ====> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER

5. SHIPPER -- NAME AND FACILITY
Lawrence Livermore National Laboratory for the US DOE
7000 East Avenue (L-786)
Livermore, CA 94550

SHIPPER I.D. NUMBER: CA2890012584
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) G

Utah Generator Site Access Permit No.: 0110000015
SHIPMENT NUMBER: 9063-06-0022

CONTACT: Rich Loden
TELEPHONE NUMBER (Include Area Code): (925) 422-1925

6. CARRIER -- Name and Address
Visionary Solutions LLC
111 Union Valley Rd
Suite B
Oak Ridge, TN 37830

EPA I.D. NUMBER: NMR000013086
SHIPPING DATE: 12/6/10

CONTACT
TELEPHONE (Include Area Code): 865-482-3896

SIGNATURE — Authorized carrier acknowledging waste receipt
DATE: 12/6/10

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0022

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance
TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE — Authorized consignee acknowledging waste receipt
DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE | TITLE: Shipping Coordinator | DATE: 12/6/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES		16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Non-Regulated Material Solid (demolition debris), 1 CM	NA	NA	Solid Oxide	H-3 K-40	Th-232 U-Nat	9.6248E+01	2.6013E+00	NA	31280 LBS; 678 FT3	Q00249403

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	11049.9645	NP	NP	NP	NP
	ft3	678.0000	ton	12.1805				

ACTIVITY

	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0022

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory for the US DOE

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249403/CA2890012584	2	19.1988	14188.3703	1.0000E-03	0.0000E+00	NP	29-H	19.1988	100 100	Oxide/NP	NP	H-3	1.64000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	15.6400	1.0000E-01	0.0000E+00	NP		678.0000				K-40	6.30000E+01	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	3.71000E+00	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	4.83000E+00	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	14188.3703									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	15.6400													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified

In Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 13, or additional page
100. None Required.

FORM 541 (03-06)

FORM 540

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code)
(925) 423-4205 Registrant Name: LLNL Emergency Dispatch

ORGANIZATION
Lawrence Livermore National Laboratory

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?
☐ YES
☑ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ==>: 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT?
☐ YES
☑ NO
If "Yes," provide Manifest Number ==>

EPA MANIFEST NUMBER

5. SHIPPER -- NAME AND FACILITY
Lawrence Livermore National Laboratory
7000 East Ave
L-786
Livermore, CA 94550

Utah Generator Site Access Permit No.: 0110000015

SHIPMENT NUMBER: 9063-06-0021

CONTACT: Scott A. Graham

6. CARRIER -- Name and Address
Visionary Solutions LLC
111 Union Valley Road
Suite B
Oak Ridge, Tn 37830

CONTACT: Dispatch

SIGNATURE -- Authorized carrier acknowledging waste receipt: Michael Hatto

SHIPPER I.D. NUMBER: CA2890012564
☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify): G

TELEPHONE NUMBER (Include Area Code): 925-422-1925

EPA I.D. NUMBER: NMR000013086

SHIPPING DATE: ~~12/03/2010~~ 12/7/10

TELEPHONE (Include Area Code): 865-482-3896

DATE: 12/7/2010

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 9063-06-0021

9. CONSIGNEE - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

CONTACT: Transportation Compliance

TELEPHONE (Include Area Code): (435)884-0155

SIGNATURE -- Authorized consignee acknowledging waste receipt

DATE

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature]

TITLE: Shipping Coordinator

DATE: 12/7/10

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
				H-3	K-40	Th-232	U-Nat					
Non regulated waste, solid (demolition debris) (1 CM)	NA	NA	solid oxide					9.6248E+01	2.6013E+00	NA	14680 LBS; 678 FT3	Q00249399

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

20. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) ✓ is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (03-06)

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	19.1988	kg	2883.0333	NP	NP	NP	NP
	ft3	678.0000	ton	3.1780				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	9.6248E+01	6.6970E+01	NP	NP	NP	(kg)	4.4560E-01
mCi	2.6013E+00	1.8100E+00	NP	NP	NP	(tons)	4.9119E-04

2. MANIFEST NUMBER 9063-06-0021

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME Lawrence Livermore National Laboratory

SHIPMENT ID NUMBER CA2890012584

DISPOSAL CONTAINER DESCRIPTION / WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER

5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER(S)	6. CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (ton)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2 & Note 2A)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION: RADIONUCLIDES	pCi/gm	MBq	mCi	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
Q00249399/0110000015	2	19.1988	6658.7364	1.0000E-03	0.0000E+00	NP	29-HI	19.1988	100 100	oxide/NP	NP	H-3	6.29000E+02	6.6970E+01	1.8100E+00	AU
		678.0000	7.3400	1.0000E-01	0.0000E+00	NP		678.0000				K-40	2.42000E+02	2.5789E+01	6.9700E-01	
												Th-232 [3.7000E-01 kg]	1.42000E+01	1.5170E+00	4.1000E-02	
												U-Nat [7.5600E-02 kg]	1.85000E+01	1.9721E+00	5.3300E-02	
												Subtotal		9.6248E+01	2.6013E+00	
												Total		9.6248E+01	2.6013E+00	
												Source [4.4560E-01 kg]				
Shipment Totals		19.1988	6658.7364									Source [4.4560E-01 kg]		9.6248E+01	2.6013E+00	
		678.0000	7.3400													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in Item 11, or additional page

NOTE 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (03-06)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 9063-06-0021
EnergySolutions, LLC

Isotope	Total Activity (MBq)	Total Activity (mCi)
H-3	6.6970E+01	1.8100E+00
K-40	2.5789E+01	6.9700E-01
Th-232	1.5170E+00	4.1000E-02
U-Nat	1.9721E+00	5.3300E-02

Contact Number
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865464 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	7	DA	44154	P	352		
						F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper. ~~Load # LLM13018, ShipDoc # L-169083~~. Container Numbers Q00261636, Q00261675, Q00261676, Q00261677, Q00261692, ~~Q00261693~~, Q00261703. Q261693. RBx

Load # LLM13018
ShipDoc # L-169083

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of NNSA
Signature: Richard B Loden
Month 01 Day 16 Year 13

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: GEORGE MERRIWEATHER
Signature:
Month 1 Day 16 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H 132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: EDWIN TAKAHASHI
Signature:
Month 01 Day 17 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Number
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865463 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	DA	36380	P	332 F002
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper. RBL
Load # LLM13017, ShipDoc # L-169082. Container Numbers Q00261635, Q00261667, Q00261671, Q00261674, Q00261684, Q00261688.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden for the NNSA
Signature: Richard B Loden
Month 01 Day 16 Year 13

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Mark Condy
Signature: Mark Condy
Month 01 Day 16 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: EDWIN TAKAHASHI
Signature: Edwin Takahashi
Month 01 Day 17 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Number
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865466 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-755
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	BA	37572	P	352 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper.
Load # LLM13016, ShipDoc # L-169081. Container Numbers Q00261673, Q00261679, Q00261680, Q00261681, Q00261682, Q00261683.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of NNSA
Signature: Richard B Loden
Month 01 Day 16 Year 13

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Clark Armstrong
Signature: Clark Armstrong
Month 1 Day 16 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: EDWIN TAKAHASHI
Signature:
Month 01 Day 17 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Contact Name
LLNL Emergency Dispatch

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865460 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	DA	37910	P	352 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shippong paper.
Load # LLM13015, ShipDoc # L-169080. Container Numbers Q00261678, Q00261685, Q00261686, Q00261687, Q00261689, Q00261690.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of NNSA
Signature: Richard B Loden
Month 01 Day 14 Year 13

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Mark Conoly
Signature: Mark Conoly
Month 01 Day 14 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Louis Gregory
Signature:
Month 01 Day 15 Year 2013

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Name
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865459 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-785
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	DA	37488	P	352 P002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper.
Load # LLM13014, ShipDoc # L-169079. Container Numbers Q00261691, Q00261694, Q00261695, Q00261696, Q00261697, Q00261698.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of NNSA
Signature: Richard B Loden
Month 01 Day 14 Year 13

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Transporter signature (for exports only):
Port of entry/exit:
Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: GEORGE MERRIWEATHER
Signature:
Month 1 Day 14 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Louis Gregory
Signature:
Month 01 Day 15 Year 2013

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Name
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865458 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	DA	40156	P	352 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper.
Load # LLM13013, ShipDoc # L-169078. Container Numbers Q00261699, Q00261700, Q00261701, Q00261702, Q00261704, Q00261705

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of NNSA
Signature: Richard B Loden
Month 01 Day 14 Year 13

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Clark Armstrong
Signature:
Month 1 Day 14 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone: NA
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: ED TAKAHASHI
Signature:
Month 01 Day 15 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Name

LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of: 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865454 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site -- Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6607
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt/Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	DA	38080	P	332 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper.
Shipment # LLM13012, ShipDoc # L-158995. Container Numbers Q00261651, Q00261653, Q00261706, Q00261707, Q00261708, Q00261709.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of NNSA
Signature: Richard B Loden
Month 01 Day 09 Year 13

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Mark Conoly
Signature: Mark Conoly
Month 01 Day 09 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H 132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: EDWIN TAKAHASHI
Signature:
Month 01 Day 10 Year 13

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Name
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of: 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865453 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1923 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-5807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	6A	38524	P	332 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper.
Shipment # LLM13011, ShipDoc # L-168570. Container Numbers Q00261606, Q00261614, Q00261634, Q00261647, Q00261710, Q00261711.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden for the NNSA
Signature: Richard B Loden
Month 01 Day 09 Year 13

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Joe Gardner
Signature:
Month 1 Day 9 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) N/A
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H-132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: EDWIN TAKAHASHI
Signature:
Month 01 Day 10 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Name
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865452 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	BA	35672	P	332 F002
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper.
Shipment # LLM13010, ShipDoc # L-168569. Container Numbers Q00261608, Q00261611, Q00261615, Q00261648, Q00261649, Q00261652.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of the NNSA
Signature: Richard B Loden
Month 01 Day 09 Year 13

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Clark Armstrong
Signature: Clark Armstrong
Month 1 Day 9 Year 13
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H-132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: EDWIN TAKAHASHI
Signature: Edwin Takahashi
Month 10 Day 10 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Name
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865451 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-785
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-5807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	DA	37060	P	352 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper.
Load # LLM13009, ShipDoc # L-168568. Container Numbers Q00261637, Q00261650, Q00261660, Q00261661, Q00261668, Q00261672.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of the NNSA
Signature: Richard B Loden
Month 01 Day 07 Year 13

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Joe Gardner
Signature:
Month 1 Day 7 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H-132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: EDWIN TAKAHASHI
Signature:
Month 01 Day 08 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Name
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865450 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	BA	35048	P	332 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT shipping paper.
Load # LLM13008, ShipDoc # L-168567. Container Numbers Q00261607, Q00261616, Q00261638, Q00261639, Q00261640, Q00261669.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of the NNSA
Signature: Richard B Loden
Month 01 Day 07 Year 13

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Clarke Armstrong
Signature:
Month Day Year
Transporter 2 Printed/Typed Name:
Signature: Clarke Armstrong
Month 1 Day 7 Year 13

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: EDWIN TAKAHASHI
Signature: Edwin Takahashi
Month 01 Day 08 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Contact Name
LLNL Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865449 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	DA	37672	P	352 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the bill of lading for the DOT Shipping paper.
Load # LLM13007, ShipDoc # L-168566. Container Numbers Q00261641, Q00261642, Q00261643, Q00261644, Q00261645, Q00261646.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of the NNSA
Signature: Richard B Loden
Month 01 Day 07 Year 13

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Mark Conoly
Signature: Mark Conoly
Month 01 Day 07 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H-132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: EDWIN TAKAHASHI
Signature: Edwin Takahashi
Month 01 Day 08 Year 13

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

EMERGENCY RESPONSE TELEPHONE NUMBER
1-925-423-4205 (LLNL Emergency Dispatch)

RECEIVED LB 1/14/13

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of: 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865434 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	BA	35360	P	352		
						F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the BOL for the DOT shipping paper.
RBK ~~Load #LLM13006~~; ShipDoc # L-168334 Load Number LLM13006
Container #s: Q00261603, Q00261605, Q00261617, Q00261623, Q00261632, Q00261633

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 19 Year 12

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: E.Q. Kosinski
Signature: [signature]
Month 12 Day 19 Year 12
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Louis Gregory
Signature: [signature]
Month 12 Day 20 Year 2012

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

EMERGENCY RESPONSE TELEPHONE NUMBER
1-925-423-4205 (LLNL Emergency Dispatch)

RECEIVED LB 1/14/13

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865433 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport — U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-293-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	DA	34856	P	352 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the BOL for the DOT shipping paper.
Load # LLM13005, ShipDoc # L-168305
Container #s: Q00261654, Q00261657, Q00261659, Q00261665, Q00261666, Q00261670

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL — Signature: Richard B Loden — Month 12 Day 19 Year 12

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: John Reynolds — Signature: [signature] — Month 12 Day 19 Year 12
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Louis Gregory — Signature: [signature] — Month 12 Day 20 Year 2012

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

RECEIVED 12/14/13

EMERGENCY RESPONSE TELEPHONE NUMBER
1-925-423-4205 (LLNL EMERGENCY Dispatch)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865432 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-785
Livermore CA 94550
Generator's Phone: 925-422-1923 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	BA	35486	P	352 F002		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the BOL for the DOT shipping paper.
Load # LLM13004, ShipDoc # L-168161
Container #S: Q00261610, Q00261618, Q00261619, Q00261624, Q00261627, Q00261630

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 19 Year 12

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Mark Conoly
Signature: Mark Conoly
Month 12 Day 19 Year 12
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Louis Gregory
Signature:
Month 12 Day 20 Year 2012

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

EMERGENCY RESPONSE TELEPHONE NUMBER
1-925-423-4205 (LLNL Emergency Dispatch)

RECEIVED
LB 1/4/13

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
CA2890012584	1	925-423-4205	005865431 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport — U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL418)	6	BA	33470	P	352 F002
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the BOL for the DOT shipping paper.
Load # LLM13003, ShipDoc # L-1680780
Container #s: Q00261612, Q00261613, Q00261621, Q00261625, Q00261658, Q00261664

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL — Signature: Richard B Loden — Month 12 Day 19 Year 12

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: GEORGE MERRIWEATHER — Signature: [signature] — Month 12 Day 19 Year 12
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Louis Gregory — Signature: [signature] — Month 12 Day 20 Year 2012

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

RECEIVED LB 1/14/13

EMERGENCY RESPONSE NUMBER 1-925-423-4205
(LLNL Emergency Dispatch)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of: 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865427 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-785
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSOIL419)	6	BA	36580	P	352 F002
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the BOL for DOT shipping paper.
Load # LLM13002, ShipDoc# L-168077

Container Nrs: Q00261609, Q00261620, Q00261663, Q00261631, Q00261656, ~~Q00261628~~ Q00261628

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 17 Year 12

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: John Reynolds
Signature:
Month 12 Day 17 Year 12
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: ED TAKAHASHI
Signature:
Month 12 Day 18 Year 12

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

RECEIVED
LB 1/14/13

LLNL
Emergency Dispatch

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CA2890012584
2. Page 1 of 1
3. Emergency Response Phone: 925-423-4205
4. Manifest Tracking Number: 005865444 JJK

5. Generator's Name and Mailing Address
Lawrence Livermore National Laboratory on behalf of NNSA
7000 East Ave L-786
Livermore CA 94550
Generator's Phone: 925-422-1925 Attn: Shipping

Generator's Site Address (if different than mailing address)
Lawrence Livermore National Laboratory
7000 East Ave
Livermore CA 94550

6. Transporter 1 Company Name: CAST Transport
U.S. EPA ID Number: COR000005389

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
National Security Technologies, LLC (NSTec) For the US DOE
Nevada National Security Site – Zone 2
Mercury NV 89023
Facility's Phone: 702-295-6807
U.S. EPA ID Number: NV3890090001

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN3321, Waste, Radioactive material, low specific activity (LSA-II), 7 (Fissile Excepted) [ERG 162] (BCLA-MWSO!L419)	6	DA	32052	P	352 F002
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
This manifest is for EPA tracking only. See the BOL for the DOT shipping paper.
Load Number LLM13001, ShipDoc Number L-168076
Container Numbers: Q00261604, Q00261622, Q00261626, Q00261629, Q00261655, Q00261662
LDZ

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Richard B Loden on behalf of LLNL
Signature: Richard B Loden
Month 12 Day 17 Year 12

INT'L
16. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Transporter signature (for exports only):
Date leaving U.S.:

TRANSPORTER
17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Mark Conoly
Signature: Mark Conoly
Month 12 Day 17 Year 12
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY
18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: ED TAKAHASHI
Signature: Ed Takahashi
Month 12 Day 18 Year 12

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

Appendix U

DTSC CEQA Notice of Exemption

CALIFORNIA ENVIRONMENTAL QUALITY ACT
NOTICE OF EXEMPTION

To: Office of Planning and Research
State Clearinghouse
P.O. Box 3044, 1400 Tenth Street, Room 212
Sacramento, CA 95812-3044

From: Department of Toxic Substances Control
Brownfields and Environmental Restoration Prgm.
8800 Cal Center Drive
Sacramento, CA 95826

Project Title: Closure of Building 419 Hazardous Waste Treatment Facility

Project Location: Lawrence Livermore National Laboratory (LLNL), 7000 East Avenue, Livermore, CA 94550

County: Alameda

Project Description:

Background: Building 419 was constructed in the 1940s and was used for aircraft maintenance and repair. The building was later was used for hazardous waste storage and treatment. The building is being closed and environmental restoration is necessary to address historical releases of hazardous waste. This Notice of Exemption (NOE) focuses on the potential impacts resulting from the removal of contaminated soil.

DTSC public noticed and approved the Closure Plan for Building 419 in 2009. This NOE supplements the Initial Study and Negative Declaration prepared for the Closure Plan [SCH# 2009062024]. The documents prepared in 2009 assumed that 50 cubic yards of soil would require removal. The results of soil sampling now indicate that an additional 450 cubic yards of soil will require removal. This NOE accounts for the additional soil and concludes that there will be no significant impact from the change to the project.

Project Activities: The project involves the excavation and off-site disposal of approximately 500 cubic yards of soil. The soil will be excavated from three locations below the former building at depths up to 15 feet below grade. The Closure Plan provides for use of spray misting to control the generation of fugitive dust during closure activities. Work will not be conducted during high wind conditions. In addition, LLNL will perform wheel washing, as needed, to ensure that trucks do not track soils away from the project site. LLNL will monitor dust levels with a particle analyzer to ensure that dust suppression measures are effective. Similar dust control measures were used during the building demolition phase of the closure (already completed) and proved effective.

LLNL staff will wear personnel protective equipment (PPE) to prevent contact with the soil. The required PPE will be task specific and include any combination of boots, gloves, dust suit, hard hat, safety glasses and dust mask. The excavations will be cordoned off to prevent a falling hazard. If access to the excavation is necessary for confirmation soil sampling then shoring will be provided and confined space entry procedures will be followed.

The soil will be placed into Department of Transportation (DOT) approved containers, and will be transported to the Nevada National Security Site for disposal. The soil will be classified as either low level radioactive waste or low level mixed radioactive waste and will be manifested accordingly. LLNL estimates that 90 truck trips will be required to haul the soil. The trucks will travel on highways and freeways and will utilize beltways and loop roads to avoid urbanized areas when possible. A combination of truck and rail transportation may be used.

The excavation will be backfilled with clean soil sourced from stockpiles elsewhere at LLNL. The site will be graded, paved, and converted into additional parking spaces.

Name of Public Agency Approving Project: Department of Toxic Substances Control

Name of Person or Agency Carrying Out Project: Ms. Vicki Salvo, (925) 423-5432

Exemption Status: (check one)

- ☐ Ministerial [PRC, Sec. 21080(b)(1); CCR, Sec. 15268]
- ☐ Declared Emergency [PRC, Sec. 21080(b)(3); CCR, Sec.15269(a)]
- ☐ Emergency Project [PRC, Sec. 21080(b)(4); CCR, Sec.15269(b)(c)]
- ☐ Categorical Exemption: [State type and section number]
- ☐ Statutory Exemptions: [State code section number]
- ☒ General Rule [CCR, Sec. 15061(b)(3)]

Exemption Title: With certainty, no possibility of a significant environmental impact

Reasons Why Project is Exempt: DTSC concludes that the project qualifies for a general rule exemption for the following reasons:

- The original Initial Study analyzed the mitigation measures in place for the removal of 50 cubic yards of soil. These same mitigation measures are appropriate for the removal of 500 cubic yards of soil. Provisions for truck wheel washing have been added to account for the larger volume of soil.
- The soil removal activities will be completed in less than three weeks which is a relatively short duration.
- LLNL is a highly secure facility and no access by the public will be permitted. In addition, only staff directly involved in the project will be allowed to access the project site.
- DTSC requested a new search of the Sacred Lands Database maintained by the Native American Heritage Commission and no known cultural resources were identified. The project includes provisions that if any artifacts of potential significance are found then all work will stop while the find is assessed.
- DTSC updated the original estimate of project emissions to account for the additional soil. DTSC assumed that only trucks would be used for transportation because this resulted in greatest emissions. The project emissions were below significance thresholds published by the Bay Area Air Quality Management District.

Evidence to support the above reasons is documented in the project file record, available for inspection at the Department of Toxic Substances Control, Brownfields and Environmental Restoration Program, 8800 Cal Center Drive, Sacramento, California 95826; call (916) 255-3779 for an appointment.

Ryan Batty, P.E.	Hazardous Substances Engineer	(916) 255-6424
Project Manager Name	Project Manager Title	Phone #

Rizgar Ghazi

Unit Chief Signature

9/24/12

Date

Rizgar Ghazi, P.E.	Supervising Hazardous Substances Engineer	(916) 255-6665
Unit Chief Name	Branch Chief Title	Phone #

TO BE COMPLETED BY OPR ONLY

Date Received For Filing and Posting at OPR: