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# E\$mergency Response Capability BNA Co9mpliance Assessment

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September 16, 2013

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# Emergency Response Capability Baseline Needs Assessment Compliance Assessment



## Lawrence Livermore National Laboratory

Also Covers:  
Sandia National Laboratory/California

August 2013

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**Lawrence Livermore National Laboratory**

**2013**

**Emergency Response Capability  
BASELINE NEEDS ASSESSMENT  
Compliance Assessment**

Revision 8

August 2013

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## 1.0 Introduction and Executive Summary

### 1.1 Introduction

This document was prepared by John A. Sharry, LLNL Fire Marshal and Division Leader for Fire Protection and was reviewed by LLNL Emergency Management Department Head, James Colson. This document is the second of a two-part analysis of Emergency Response Capabilities of Lawrence Livermore National Laboratory. The first part, 2013 Baseline Needs Assessment Requirements Document established the minimum performance criteria necessary to meet mandatory requirements. This second part analyses the performance of Lawrence Livermore Laboratory Emergency Management Department to the contents of the Requirements Document.

The document was prepared based on an extensive review of information contained in the 2009 BNA, the 2012 BNA document, a review of Emergency Planning Hazards Assessments, a review of building construction, occupancy, fire protection features, dispatch records, LLNL alarm system records, fire department training records, and fire department policies and procedures. The 2012 BNA was approved by NNSA's Livermore Field Office on June 7 2013 with a request for a revision to update the BNA to reflect new DOE Order 420.1C and answer certain additional justification issues. In addition to the revisions requested by LFO, this BNA also updates requirements from NFPA codes and standards that had changed since the completion of the 2012 BNA. Because of these requirement changes, and the comments the LFO, the evaluation of certain items were revised and this BNA is considered a new BNA based on NFPA requirements in effect on January 1, 2013.

On October 1, 2007 LLNL contracted with the Alameda County Fire Department (ACFD) to provide emergency response services. The emergency response services contract was again awarded to the ACFD in 2011 with a start date of July 1, 2012. The new contract included some staffing changes that were considered equivalent to those previously provided. Those changes are reflected in this document.

### 1.2 Executive Summary – Performance Assessment

#### 1.2.1 Performance Status – Manual Firefighting LLNL Site 200

**Table 1.2.1 Performance Status Summary Manual Firefighting Site 200**

Type Incident	Responder	Minimum Staffing (persons)	Total Response Time	Performance Criteria	Criterion Met or Not Met
Fire Sprinklered Bldg	1 <sup>st</sup> Unit	3	380	90 %	Met (95.6%)
	1 <sup>st</sup> Alarm	5	620		
Fire Non-sprinklered Bldg	1 <sup>st</sup> Unit	3	380	90 %	Met (95.6%)
	1 <sup>st</sup> Alarm	11	620		
Wildland Fire	Fire Attack	4	440	90%	Met
	First Alarm	5	620		

**1.2.1.1 Observations – Manual Firefighting LLNL Site 200**

None

**1.2.2 Performance Status Manual Firefighting – Site 300****Table 1.2.2 Performance Status Summary – Fire Response S-300**

Type Incident	Responder	Minimum Staffing (persons)	Total Response Time	Performance Criteria	Performance Criterion Met or Not Met
GSA Area Fire Sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 5	380 sec. 1800 sec.	90 %	Met (95%)
GSA Area Fire Non-sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 11	380 sec. 1800 sec.	90 %	Met (95%)
Non GSA Area Fire Sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 5	960 sec. 2760 sec.	90 %	Not Evaluated
Non GSA Area Fire Non-sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 11	960 sec. 2760 sec.	90 %	Not Evaluated
Wildland Fire	Fire Attack 1 <sup>st</sup> Alarm	4 5	1020 sec. 2760 sec.	90%	Not Evaluated

**1.2.2.1 Observations – Manual Firefighting Site 300**

None

**1.2.3 Performance Status – Emergency Medical Service****Table 1.2.3 Performance Status Summary -- EMS**

Type Incident	Responders	Minimum Staffing (persons)	Response Time	Performance Criteria	Performance Criterion Met or Not Met
All EMS Except Non GSA Site 300	1 <sup>st</sup> Responder Transport	1 ALS 2 BLS	480 sec.	90%	Met
EMS Non GSA Site 300	1 <sup>st</sup> Responder Transport	1 ALS 2 BLS	900 sec.	90%	Not Evaluated

**1.2.3.1 Observations – Emergency Medical Service**

None

**1.2.4 Performance Status – Hazardous Materials**

**Table 1.2.4 Performance Status Summary -- HAZMAT**

Staffing	Training Level	Performance Criterion	Performance Criterion Met or Not Met
<b>Investigation Level Incident</b>			
4	Trained Personnel 380 sec. Response time	90%	Met
<b>Level I Incident</b>			
12	Trained Personnel		Met
<b>Level II Incident</b>			
17	Trained Personnel		Met

**1.2.4.1 Observations – Hazardous Materials**

None

**1.2.5 Performance Status – Technical Rescue**

**Table 1.2.5 Performance Status Summary – Technical Rescue**

Location	Responders	Minimum Staffing (persons)	Total Response Time	Performance Criterion	Performance Criterion Met or Not Met
S-200, Sandia/CA GSA Area S-300	Operations Level	5	380 sec.	90 %	Met
S-200, Sandia/CA GSA Area S-300	Technician Level	7	620 sec.	90 %	Met
Non GSA Area S-300	Operations Level	5	960 sec.	90 %	Met
Non GSA Area S-300	Technician Level	7	2760 sec.	90 %	Met

**1.2.5.1 Observations – Technical Rescue**

None

**1.2.6 Performance Status – Second Incident**

**Table 6.6.4 Performance Status -- Second Incident**

Type Incident	Responders	Total Response Time	Performance Criteria	Criterion Met or Not Met
Second Incident	1 Company	1240 seconds	90 %	Met

**1.2.6.1 Observations – Second Incident**

None.

### 1.2.7 Performance Status -- Emergency Communications

**Table 1.2.6 Performance Status Summary – Emergency Communications**

Event	Time Criteria	Performance	Criterion Met or Not Met
Dispatcher training	N/A	NFPA 1061	Met
Answer 911 phone	15 seconds	95%	Met
	40 seconds	99%	Met
Acknowledge alarm	15 seconds	95%	Not Met (89.8%)
	40 seconds	99%	Not Met (98.2%)
Dispatch Emergency	60 seconds	80%	Met (94.18.7%)
	106 seconds	95%	Met (96.8%)
Dispatch EMS Emergency	90 seconds	90%	Met (93.4%)
	120 seconds	99%	Met (99.8%)
Lab Alarms transmit alarms to ACRECC	45 seconds	95%	Met
ACRECC and/or Lab Alarms Notify Appropriate Party of Supervisory or Trouble Alarm	600 seconds	95%	Met

#### 1.2.7.1 Observations – Emergency Communications

1. ACRECC could improve performance on alarm acknowledgement times. While Alarm acknowledgement times slightly less than the standard, dispatch performance exceeds the criterion.
2. Sandia/CA should improve emergency alarms processing time by having the LLNL fire alarm system become their primary system, reporting all information directly to the system rather than have the CAS operator call with detailed information.
3. The Sandia/CA CAS should be upgraded by either providing the CAS operators training and procedures to meet NFPA 1221 standards or moving the function of the 911 answering point to ACRECC.

### 1.2.8 Performance Status – Training and Certification

**Table 1.2.8 Performance Status Summary - Training**

<b>Personnel</b>	<b>Performance Measure</b>	<b>Performance Criterion Met or Not Met</b>
Entry level	Qualifications are established for entry-level fire department personnel that include medical and physical performance criteria.	Met
Entry level	There is an established training criterion for minimum performance of entry-level personnel.	Met
Incumbents	There is an established on-going training criterion for training for incumbents.	Met
Officers	There is a minimum training criteria established for fire officers or supervisors of emergency responder.	Met
Special Operations	There is a minimum training criteria established for special operations such as hazardous materials and technical rescue.	Met
Drills and Exercises	There is an established program of drills and exercises at various facilities on LLNL site.	Met
All	Documented training records exist for each individual.	Met

#### 1.2.8.1 Observations – Training and Certification

None

### 1.2.9 Performance Status – Pre-Fire Plans

**Table 1.2.9 Performance Status Summary– Pre-Fire Plans**

<b>Performance Measure</b>	<b>Frequency</b>	<b>Performance Criterion Met or Not Met</b>
Provide updates for pre-fire plans for all buildings	Quarterly	Met
Provide written standard operating procedures for response to occupancies with hazardous materials or other unique hazards	Annually	Met

### 1.2.9.1 Observations – Pre-Fire Plans

- Emergency Call-Out Lists and Special Information Sheets could be improved by proper quarterly review by ACFD and LLNL Fire Protection Division to ensure quarterly updates are placed in the Runcards in a timely manner.

### 1.2.10 Performance Status – Emergency Response Apparatus

**Table 1.2.10 Performance Status Required First Line & Reserve Apparatus**

Type Apparatus	Number	Comment	Criterion Met or Not Met
Engine	3	Livermore Site – 2, S-300 – 1	Met
Aerial Ladder	1	Livermore Site	Met
Ambulance	2	Livermore Site – 1, S-300 – 1	Met
Type 3 Engine	1	S-300	Met
Type 4 Engine	2	Livermore Site – 1, S-300 – 1	Met
Hazardous Materials	1	Responds both sites	Met
Command	1	Battalion Chief	Provided by ACFD
Reserve Type 1 Engine	1	1 Reserve per 5 in front-line service	Not Met
Reserve Ambulance	1	1 Reserve per 5 in front-line service	Met
Reserve Type 3 Engine	1	1 Reserve per 5 in front-line service	Met
Reserve Type 4 Engine	1	1 Reserve per 5 in front-line service	Met
Apparatus Plan		Written 5 year Plan	Met
Apparatus Maintenance		Per NFPA and GSA Fleet Requirements	Met

#### 1.2.10.1 Observations – Emergency Apparatus

- LLNL should provide a reserve Type 1 engine to assure proper coverage in case of a Type 1 engine breakdown or unavailability for extended maintenance.

## 2.0 Purpose

The purpose of this document is to compare the actual response capabilities of Lawrence Livermore National Laboratory to the minimum performance criteria established in the 2012 Baseline Needs Assessment Requirements Document.

## 3.0 Scope

This compliance assessment covers the following items as developed by the Baseline Needs Assessment Requirements Document.:

Emergency Management Department

Response to fire emergencies  
Response to medical emergencies  
Response to hazardous materials emergencies  
Response to situations requiring technical rescue  
Response to a second incident  
Fire fighter collateral duties  
Emergency communications and dispatch requirements  
Training requirements for emergency responders  
Pre-fire plan requirements including Emergency Planning Hazard Assessments  
Emergency response apparatus  
Other fire protection program components (typically, those requiring fire protection engineering support) are not included.

## **4.0 Assumptions**

This Compliance Assessment is prepared based on the 2013 Baseline Needs Assessment Requirements Document Revision 8 of August 2013. The Baseline Needs Assessment identifies the emergency response requirements taken from applicable regulatory documents (primarily NFPA Codes and Standards) and modified as needed for application at the LLNL and Sandia/CA sites. The Baseline Needs Assessment defines the criteria used to evaluate compliance of the emergency response capability.

## **5.0 Emergency Response Organization**

### **5.1 Alameda County Fire Department**

The Alameda County Fire Department (ACFD) is a full time fire department was formed on July 1, 1993 as a dependent special district with the Alameda County Board of Supervisors as its governing body. This consolidation brought together into a single jurisdiction the Castro Valley Fire Department, the Eden Fire Department and County Fire Patrol (each a dependent special district under the Board of Supervisors). The department provides all risk service to those unincorporated areas of Alameda County and provides services under contract to the Cities of Dublin, Emeryville, Newark, San Leandro, Union City, as well as Lawrence Berkeley National Laboratory.

Effective October 1, 2007, ACFD was awarded a contract to provide emergency response services for Lawrence Livermore National Laboratory including LLNL's Site 300 and Sandia/CA. In January 2008, ACFD also assumed responsibility for running the Alameda County Regional Emergency Communications Center (ACRECC) and became responsible for monitoring the LLNL Fire and Emergency Voice Alarm System, which included monitoring fire alarms for not only LLNL, but also Sandia/CA, Lawrence Berkeley National Laboratory, and Parks Reserve Training Center. The Emergency Response Contract was again awarded to ACFD in 2011 with a start date of July 1, 2012.

### 5.1.1 ACFD Stations and Staffing

ACFD operates 35 fire stations covering approximately 508 square miles in the communities it serves. The LLNL fire stations are numbers 20 and 21 in the county system. Overall, ACFD has over 400 personnel providing 24/7 coverage which includes 3 Battalions, 30 engine companies, 5 truck companies and specialized equipment such as an Air/Light/Support Unit, a Heavy Rescue Vehicle, a Hazardous Materials Response Vehicle, a 2,500 gallon Water Tender, and a dozer.

ACFD provides three companies at LLNL. At Site 200, each company has a minimum staffing of a Captain and two fire fighters. At Site 300, the company has minimum staffing of a Captain and three firefighters. ACFD has co-located Engine 8 at Station 20 giving LLNL access to a third three person company when that company is not otherwise committed. In addition to fire fighter qualifications, all company members are Emergency Medical Technicians with one being a Paramedic. At Station 20, which serves LLNL Site 200 and the Sandia/CA campus, there are two companies. Station 20 companies are required to be HazMat Companies, meaning that all members of these companies are required to have Hazardous Materials Technician qualifications with the Captain having Hazardous Materials Specialist qualifications.

Upon award of the contract for emergency services, ACFD absorbed all current LLNL fire fighters into their organization so there was no break in service, qualifications, or level of security clearance. All fire fighters permanently assigned to LLNL possess a DOE security clearance and, in addition, 130 ACFD members in other stations have security clearances and qualifications to work at LLNL.

Before being able to work at either of the LLNL fire stations an ACFD employee must take a minimum level LLNL site-specific training. After working 14 shifts at LLNL an ACFD member has to take the remaining LLNL specific training. Personnel not assigned to LLNL on a permanent basis are only permitted to fill one of the four positions on any company. In that way, staff temporarily assigned to LLNL, are supported by personnel who are fully LLNL qualified.

The LLNL Battalion Chiefs were absorbed into ACFD and became the chief officers assigned to ACFD Battalion 3. Although they serve all of Battalion 3, they are housed in Station 20 on the LLNL campus.

Since the beginning of the ACFD contract, several of the original LLNL fire fighters and one Battalion Chief have either retired or "bid" another ACFD station. The Battalion Chief's position was filled by an existing ACFD Battalion Chief who is assigned to LLNL on a permanent basis. In addition to the Battalion Chiefs, ACFD provides a Division Chief to serve as liaison to LLNL. This Division Chief is also an emergency responder.

## 5.2 Mutual and Automatic Aid

LLNL, as an entity, is still signatory to several mutual and automatic aid agreements. LLNL meets its obligations to these agreements through its subcontractor, the Alameda County Fire Department. The agreements are as follows:

- ♦ Automatic Aid Agreement with the Livermore-Pleasanton Fire Department
- ♦ Alameda County Mutual Aid Agreement
- ♦ Mutual Threat Zone MOU with California Division of Forestry (provides automatic aid for wildland fires at S-300)
- ♦ Mutual Fire Protection Resources Agreement with City of Livermore

## 5.3 Alarm Monitoring and Emergency Dispatch

From its inception in early 2001, the organization that became the Alameda County Emergency Communications Center (ACRECC) was operated by the LLNL Emergency Management Division and later the Emergency Management Department. Beginning in January 2008, operation of ACRECC was turned over to ACFD and certain alarm monitoring and emergency activities became part of the contract between ACFD and LLNL. Included in those services are monitoring the LLNL fire alarm system, which includes alarms being received from Sandia/CA, Lawrence Berkeley National Laboratory, and Parks Army Training Center. In addition, ACRECC is responsible for the following functions and operations:

- ♦ Answering emergency (911) telephone calls.
- ♦ Dispatching emergency fire and emergency medical apparatus via station alerting systems and radio for LLNL and Sandia National Laboratory.
- ♦ Monitoring and responding to active fire alarms for LLNL and Sandia National Lab.
- ♦ Tracking emergency and non-emergency response resources via radio and telephone.
- ♦ Providing emergency pager notification for deaf employees.
- ♦ Making Emergency Alert System announcements for Site 200 and 300.
- ♦ Participating in facility and site drills and exercises as required by DOE Order 151.1.C.
- ♦ Coordinating emergency response with LLNL and Sandia National Laboratory Protective Force personnel.

## 6.0 Analysis of Services Provided

### 6.1 Manual Fire Suppression – LLNL Site 200

#### 6.1.1 Minimum Performance Measure – LLNL S-200

##### Sprinklered Buildings

*Respond to reported fires from buildings with sprinkler protection with an alarm assignment of two engine companies and a Battalion Chief in a manner to provide for arrival of the first engine company within a Total Response Time of 380*

*seconds 90% of the time and the arrival of the remainder of the alarm assignment within a Total Response Time of 620 seconds 90% of the time.*

#### Unsprinklered Buildings

*Respond to reported fires from buildings without sprinkler protection with an alarm assignment of three engine companies, a truck company and a Battalion Chief in a manner to provide for arrival of the first engine company within a Total Response Time of 380 seconds 90% of the time and the arrival of the remainder of the alarm assignment within a Total Response Time of 620 seconds 90% of the time.*

#### Wildland Fire

*Respond to a reported wildland fire within a Total Response Time for a two-flank wildland fire attack of 440 seconds 90% of the time and provide for the arrival of a Battalion Chief within a Total Response Time of 620 seconds 90% of the time.*

### 6.1.2 Performance Summary – Manual Fire Fighting LLNL Site 200

**Table 6.1.2 Performance Summary – Manual Fire Fighting Site 200**

Type Incident	Responders	Minimum Staffing (persons)	Total Response Time	Performance Criteria
Fire Sprinklered Bldg	1 <sup>st</sup> Unit	3	380	90%
	1 <sup>st</sup> Alarm	5	620	
Fire Unsprinklered Bldg	1 <sup>st</sup> Unit	3	380	90%
	1 <sup>st</sup> Alarm	11	620	
Wildland Fire	Fire Attack	4	440	90%
	1 <sup>st</sup> Alarm	5	620	

### 6.1.3 Services Provided – Manual Fire Fighting LLNL Site 200

ACFD provides LLNL with minimum on-duty staffing at Fire Station 20 (LLNL Site 200) of seven persons (2 Captains, 4 Fire Fighters, and 1 Battalion Chief). In addition, ACFD has stationed Engine 8 at LLNL which gives LLNL access to 3 additional personnel most of the time (approx. 60% of the time). Having Engine 8 stationed at LLNL has also reduced the number of off-site emergency responses by LLNL companies by more than 80%. This staffing is sufficient to provide the minimum response to buildings protected by automatic sprinklers.

For fires in unprotected structures, which represent about 40% of the structures on LLNL property, but only 10% of the building area, the Fire Department at LLNL does not have sufficient resources to meet the minimum initial attack criteria and relies on mutual and automatic aid.

The ACFD standard response schedule for a structure fire calls for the response of three engines, one truck, and a Battalion Chief.

To determine compliance with the Total Response Time criterion, dispatch records for 43 months (January 2010 through July 2013) were examined. Disallowing any incident with incomplete or inconsistent information, 901 incidents were evaluated for response time. Response times for first unit exceeded minimums by meeting the time criterion 93.3% of the time. There were insufficient data on first alarm response times to draw any conclusions, however, the three times a full first alarm was required, the criterion was met. Wildland responses on Site 200 were too few to draw any conclusions, but are evaluated as met based on structure fire response times.

Station 20 meets the fire attack requirement by the dispatch of two 3 person companies and Battalion Chief to a response to a sprinklered building. This provides the necessary 5 persons to initiate fire attack. Responses to reported fires in all buildings, sprinklered or unsprinklered, receive a response of three 3 person engine companies, a three person truck company, and a Battalion Chief. This provides a total of 13 responders more than necessary to meet the first alarm response requirements for an unsprinklered building. The assignment is normally filled by three engines from Station 20 (E-20, E520, E-8), and a Truck from Livermore Pleasanton Station 98. When Engine 8 is on another assignment, the third engine comes from the nearest ACFD Station which is normally Station 18 on Fallon Rd. in Dublin. Additional resources for emergency response are based on nearest available unit as determined by the computer aided dispatch (CAD) system.

When Station 20 resources are reduced to one company, ACFD “moves-up” a company from another station to ensure there is a fire attack capability at Station 20. Because all fire stations in the Livermore Valley are dispatched by the Alameda County Regional Communications Center (ACRECC) this is done seamlessly. Nonemergency move-up companies are from other ACFD stations to ensure that personnel have LLNL clearances. ACFD has endeavored to provide clearances to personnel at the two fire stations closest to LLNL to permit this seamless move-up capability. Emergency move-ups are from the closest stations available regardless of agency.

Firefighters at LLNL have the following corollary duties: hose testing, hydrant flow testing and lubrication, and incidental issuance of hot work permits (when fire inspectors are not on duty). Station 20 personnel have a limited fire inspection assignment of 30 buildings per month, while Station 21 personnel perform all monthly fire prevention inspections. None of these assignments has been found to impede emergency response.

**6.1.4 Performance Status -- Manual Firefighting LLNL Site 200**

**Table 6.1.4 Performance Status Summary – Manual Firefighting Site 200**

Type Incident	Responder	Minimum Staffing (persons)	Total Response Time	Performance Criteria	Criterion Met or Not Met
Fire Sprinklered Bldg	1 <sup>st</sup> Unit	3	380	90 %	Met (93.3%)
	1 <sup>st</sup> Alarm	5	620		
Fire Non-sprinklered Bldg	1 <sup>st</sup> Unit	3	380	90 %	Met (93.3%)
	1 <sup>st</sup> Alarm	11	620		
Wildland Fire	Fire Attack	4	440	90%	Met
	1 <sup>st</sup> Alarm	5	620		

**6.1.5 Observations – Manual Firefighting Site 200**

None

**6.2 Manual Fire Suppression – Site 300**

**6.2.1 Minimum Performance Measure – Site 300**

GSA Sprinklered Buildings –

*Respond to alarms in buildings with sprinkler protection within the General Services Area of Site 300 with an alarm assignment of one engine company (minimum staff of 4) to provide for arrival within a Total Response Time of 380 seconds 90% of the time and provide for the arrival of a Battalion Chief within a Total Response Time of 1800 seconds 90% of the time.*

GSA Non-Sprinklered Buildings

*Respond to alarms in buildings without sprinkler protection within the General Services Area of Site 300 with alarm assignment of three engine companies (each with a staff of 4) and a Battalion Chief in a manner to provide for arrival of the first engine company within a Total Response Time of 380 seconds 90% of the time and the arrival of the remainder of the alarm assignment within a Total Response Time of 1800 seconds 90% of the time.*

Outside of GSA Sprinklered Buildings

*Respond to fire incidents outside of the general services area with an alarm assignment of one engine company to provide for arrival within a Total Response Time of 960 seconds 90% of the time and provide for the arrival of a Battalion Chief within a Total Response Time of 2760 seconds 90% of the time.*

Outside of GSA Non-Sprinklered Buildings

*Respond to alarms in buildings without sprinkler protection outside of the General Services Area of Site 300 with alarm assignment of three engine companies and a Battalion Chief in a manner to provide for arrival of the first engine company within a Total Response Time of 960 seconds 90% of the time*

*and the arrival of the remainder of the alarm assignment within a Total Response Time of 2760 seconds 90% of the time.*

#### Wildland Fires

*Respond to a reported wildland fire at Site 300 within a Total Response Time for a two-flank wildland fire attack of 1020 seconds 90% of the time and provide for the arrival of a Battalion Chief within a Total Response Time of 2760 seconds 90% of the time.*

### 6.2.2 Performance Summary – Manual Firefighting Site 300

**Table 6.2.2 Performance Summary – Manual Firefighting S-300**

Type Incident	Responders	Minimum Staffing (persons)	Total Response Time	Performance Criteria
GSA Area Fire Sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 5	380 sec. 1800 sec.	90 %
GSA Area Fire Non-sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 11	380 sec. 1800 sec.	90 %
Non GSA Area Fire Sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 5	960 sec. 2760 sec.	90 %
Non GSA Area Fire Non-sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 11	960 sec. 2760 sec.	90 %
Wildland Fire	Fire Attack 1 <sup>st</sup> Alarm	4 5	1020 sec. 2760 sec.	90%

### 6.2.3 Services Provided – Manual Fire Fighting Site 300

ACFD has minimum on-duty staffing at Fire Station 21 (Site 300) of four persons (1 Captain, 3 Fire Fighters). An engine company and chief officer are dispatched from the Livermore Site on every fire response, but with an extended arrival time due to travel distance.

The rural nature of Site 300 dictates specialized tactics for structure fires in order to meet provisions of the various requirement documents concerning the 2In/2Out fire fighter safety requirement. If an interior structural fire as defined within the OSHA regulation and NFPA 1500 is encountered, the first arriving engine company will perform other functions such as, rescue, treatment of the injured, establishment of a water supply, stretch hose lines in preparation for fire attack, and protect exposures until the arrival of the second engine company. In concert with the OSHA rule and NFPA 1500 requirements, a rescue attempt can be made before the arrival of the second engine company if an imminent life-threatening situation is encountered.

Considering the remote location of Site 300, and considering that many of buildings at Site 300 outside of the GSA area will require a 30-minute cooling off period prior to any entry, the fire incident response plan and tactical plan is appropriate, meets the intent of the requirement documents and meets the minimum response criteria established in the Baseline Needs Assessment.

Wildland fire control at Site 300 is a hazard that is mitigated significantly by the annual prescribed burn. The prescribed burn confines a potential fire to the property boundaries of Site 300, eliminates the fuel in high fire probability areas (high explosive test areas), and generally breaks the fuel path, thereby limiting the size of potential fires in other areas. The Fire Department has been successfully conducting prescribed burns at Site 300 for over 45 years. Three documents describe and regulate the prescribed burns, the *Prescribed Burning/Smoke Management Plan<sup>i</sup> Site 300 Explosive Test Facility Prescribed Burn/Smoke Management Plan<sup>ii</sup>* and EMD Procedure 1606, *Tactical Plan-Command Procedures: Controlled Burns at Site 300.*<sup>iii</sup>

Because of the prescribed burn process, fire fighters assigned to Station 21 are well trained and experienced with “back-fire” techniques and use that technique extensively as a fire control measure when responding to wildland fires at Site 300. Staffing at Station 21 allows a standard two-flank attack. LLNL fire fighters have a history of aggressive wildland fire attack at Site 300 and control most fires with the initial response. As with all fire incidents, additional equipment is dispatched from the Livermore Site, but with an extended arrival time. Wildland fires beyond the capabilities of the initial fire attack are usually held in check by the prescribed burn boundaries, but LLNL’s Mutual Threat Zone Agreement with the CAL Fire allows for specialized resources such as firefighting helicopters and tankers in addition to normal wildland mutual aid.

Response statistics for the past 43 months indicate a continued very low number of responses at Site 300. A total of 73 responses were evaluated, most (64) being within the GSA area. Responses in non GSA areas and wildland fires were too few to evaluate, however, a full alarm assignment for a chemical accident in the Non GSA Area revealed the full alarm assignment was on scene in 1690 seconds, well within the metric criterion.

The Fire Department also supports the community surrounding Site 300 by providing fire response to the areas immediately adjacent to Site 300 property, an area with no recognized fire department. During the past three calendar years, off-site responses average 155 per year, overwhelmingly these were EMS responses to the Carnegie State Vehicular Recreational Area (Carnegie SVRA).

The ACFD wildland fire incident response plan and tactical plan is appropriate and meets the minimum response criteria established in this assessment.

#### 6.2.4 Performance Status – Manual Firefighting Site 300

**Table 6.2.4 Performance Status Summary – Fire Response Site 300**

Type Incident	Responder	Minimum Staffing	Response Time	Performance Criteria	Performance Criterion
GSA Area Fire Sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 1	380 sec. 1800 sec.	90 %	Met (94.8%)
GSA Area Fire Non-sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 13	380 sec. 1800 sec.	90 %	Met (94.8%)
Non GSA Area Fire Sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 1	960 sec. 2760 sec.	90 %	Not Evaluated

Non GSA Area Fire Non-sprinklered Bldg	1 <sup>st</sup> Unit 1 <sup>st</sup> Alarm	4 13	960 sec. 2760 sec.	90 %	Not Evaluated
Wildland Fire	Fire Attack 1 <sup>st</sup> Alarm	4 1	1020 sec. 2760 sec.	90%	Not Evaluated

**6.2.5 Observations – Manual Firefighting Site 300**

None

**6.3 Emergency Medical Service**

**6.3.1 Minimum Performance Measure – EMS**

Site 200, Sandia/CA, GSA Area of S-300

*Arrive on scene of an EMS incident on the at Site 200, Sandia/CA, or the GSA Area of S-300 with first responder/transport ALS capability of one ALS and two BLS qualified responders within a response time of 480 seconds 90% of the time.*

Outside of GSA Area of S-300

*Arrive on the scene of an EMS incident Outside of the GSA Area of Site 300 with first responder/transport ALS capability of one ALS and two BLS qualified responders within a Total Response Time of 2,100 seconds 90% of the time.*

**6.3.2 Performance Summary -- EMS**

**Table 6.3.2 Performance Summary -- EMS**

Type Incident	Responders	Minimum Staffing (persons)	Response Time
All EMS Except Non GSA Site 300	1 <sup>st</sup> Responder/Transport	1 ALS 2 BLS	480 sec.
EMS Non GSA Site 300	1 <sup>st</sup> Responder/Transport	1 ALS 2 BLS	900 sec.

**6.3.3 Services Provided – EMS**

ACFD staffs every company with one ALS qualified fire fighter. All fire fighters are BLS qualified as Emergency Medical Technician 1 with the transport or ambulance training module.

All LLNL ambulances are ALS qualified. LLNL responds each engine company as a first responder ALS unit; thus, each engine is equipped with the necessary ALS equipment and drugs.

Fire Station 20 houses a first line ambulance and the reserve ambulance. The reserve ambulance is equipped and maintained as a first response unit and can immediately be used for a second or simultaneous ambulance response. As with fire responses, a unit is dispatched from the Livermore site to any response at Site 300. In this case, an ambulance will respond from Fire Station 20 to any EMS call at Site 300 to assist, provide back-up, and if necessary cover-in at Station 2.

In evaluating 43 months of data for EMS responses, which totals 226 incidents, the performance met the criterion with 91.5% metric. There were insufficient responses outside the GSA area at S-300 to evaluate.

**6.3.4 Performance Status Summary -- EMS**

**Table 6.3.4 Performance Status Summary -- EMS**

Type Incident	Responders	Minimum Staffing (persons)	Response Time	Performance Criteria	Performance Criterion Met or Not Met
All EMS Except Non GSA Site 300	1 <sup>st</sup> Responder Transport	1 ALS 2 BLS	480 sec.	90%	Met (91.5%)
EMS Non GSA Site 300	1 <sup>st</sup> Responder Transport	1 ALS 2 BLS	900 sec.	90%	Not Evaluated

**6.3.5 Observations – Emergency Medical Service**

None

**6.4 Hazardous Materials**

**6.4.1 Minimum Performance Measure – HazMat**

*Initial response to a hazardous materials incident at Site 200, Sandia/CA, and the Site 300 General Services Areas will arrive within a Total Response Time of 380 seconds 90% of the time.*

*Provide sufficient personnel trained to the proper level for a Level I or Level II hazardous materials incident prior to beginning any operations activities.*

**6.4.2 Performance Summary -- HAZMAT**

**Table 7.6.4 Performance Summary -- HAZMAT**

Task	Staffing	Training Level
<b>Investigation Level Incident</b>		
Incident Commander	1	Hazmat IC & Technician
HazMat Group	3	Awareness
<b>Total</b>	4	380 sec. 90% of the time
<b>Level I Incident</b>		
Incident Commander	1	Hazmat IC & Specialist
Safety and Tech Reference	2	HM Safety and Technician
HazMat Group	7	Technician
Medical Group	2	Operations & EMT
<b>Total</b>	12	
<b>Level II Incident</b>		
Incident Commander	1	Hazmat IC & Specialist
Safety and Tech Reference	3	Specialists & Technicians
HazMat Group	9	Technician & Operations
Time Recorder & Access Control	2	Operations
Medical Group	2	Operations and EMT
<b>Total</b>	17	

**6.4.3 Services Provided -- HazMat**

The contract with ACFD provides that Station 20 is a HazMat station and all fire fighters assigned to that station are certified Hazardous Materials Technicians and all Officers be certified Hazardous Materials Specialists. Station 21 does not require that constant level of staffing because of the general lack of hazardous materials.

Station 20 can handle an initial level and most Level 1 incidents with on-duty staffing. Full-blown hazardous materials incidents require significant equipment and staffing resources. The Fire Department on-duty staffing at LLNL, like most local agencies, does not have the capability to respond to a large hazardous materials incident without mutual aid assistance. LLNL and ACFD have developed a regional approach to hazardous materials response utilizing the County Mutual Aid Plan response to large hazardous materials incidents.

While the LLNL is able to maintain the equipment it has, it does not have the funds to update and upgrade to the newest technology equipment. That situation is improving with ACFD committing to provide new advanced diagnostic equipment to bring the LLNL Hazardous Materials Unit up to the standards of a Type 1 Hazardous Materials unit by the third year of the contract. During the past 43 months, LLNL has had to call in the resources from other ACFD stations to deal with spills of unknown materials that could have been handled locally, if the LLNL owned apparatus had been equipped with the most modern equipment. This commitment by ACFD will enhance the LLNL historical desire to be able to “stand alone” in the event of a large area disaster.

The LLNL Fire Department can meet the minimum response criteria contained in the Baseline Needs Assessment by a combination of on duty staffing and use of mutual aid. The actual response metric for hazardous materials incidents was 91.5%.

**6.4.4 Performance Status Summary – HazMat**

**Table 7.6.4 Performance Status Summary -- HAZMAT**

Staffing	Training Level	Performance Criterion	Performance Criterion Met or Not Met
<b>Investigation Level Incident</b>			
4	Trained Personnel 380 sec. Response time	90%	Met (91.5%)
<b>Level I Incident</b>			
12	Trained Personnel		Met
<b>Level II Incident</b>			
17	Trained Personnel		Met

**6.4.5 Observations – HazMat**

None

**6.5 Technical Rescue**

**6.5.1 Performance Requirements – Technical Rescue**

*Respond to reported technical rescue incidents to provide rescue and extrication of victims of structural collapse, vehicle accidents, and construction accidents or confined space accidents at Site 200, Sandia/CA, and the GSA Area of Site 300 within a total response time of 360 seconds for an Operational Level Incident 90% of the time.*

*Respond to reported technical rescue incidents to provide rescue and extrication of victims of structural collapse, vehicle accidents, and construction accidents or confined space accidents at Site 200, Sandia/CA, and the GSA Area of Site 300 within a total response time of 600 seconds for a Technician Level Incident 90% of the time.*

*Respond to reported technical rescue incidents to provide rescue and extrication of victims of structural collapse, vehicle accidents, and construction accidents or confined space accidents in the Outside of the GSA Areas of S-300 within a total response time of 960 seconds for an Operational Level Incident 90% of the time.*

*Respond to reported technical rescue incidents to provide rescue and extrication of victims of structural collapse, vehicle accidents, and construction accidents or confined space accidents in the Outside of the GSA Areas of S-300 within a total response time of 2760 seconds for a Technician Level Incident 90% of the time.*

**6.5.2 Performance Summary – Technical Rescue**

**Table 6.5.2 Performance Summary – Technical Rescue**

<b>Location</b>	<b>Responders</b>	<b>Minimum Staffing (persons)</b>	<b>Total Response Time</b>	<b>Performance Criteria</b>
S-200, Sandia/CA GSA Area S-300	Operations Level	5	380 sec.	90 %
S-200, Sandia/CA GSA Area S-300	Technician Level	7	620 sec.	90 %
Non GSA Area S-300	Operations Level	5	960 sec.	90 %
Non GSA Area S-300	Technician Level	7	2760 sec.	90 %

**6.5.3 Services Provided – Technical Rescue**

The LLNL Fire Department responds to all technical rescue incidents on LLNL and Sandia property.

An Engine Company responds to known technical rescue incidents. The engine company is provided with a hydraulic rescue tool (often called the “jaws of life” by the media), cribbing, and air rescue bags (heavy duty air inflatable bags used to lift or move heavy objects). If the incident were identified as a confined space incident, the HazMat

vehicle would also respond, since it carries the specialized confined space rescue equipment.

The normal staffing for Station 20 can provide the staffing necessary for both Operations and Technician Level responses to minor structural collapse, rope rescue, confined space rescue, vehicle and machinery rescue, and wilderness rescue. Responses to major structural collapse incidents or trench and excavation rescue incidents will require additional resources, including specialized equipment. The nearest heavy rescue vehicle is at ACFD Station 24 in San Leandro. Responses to those incidents are beyond the initial response capability being evaluated here.

There were no technical rescue incidents in the data for the past 43 months, but response times for other incidents indicate that criterion will be met.

**6.5.4 Performance Status Summary – Technical Rescue**

**Table 6.5.2 Performance Summary – Technical Rescue**

Location	Responders	Minimum Staffing (persons)	Total Response Time	Performance Criterion	Performance Criterion Met or Not Met
S-200, Sandia/CA GSA Area S-300	Operations Level	5	380 sec.	90 %	Met
S-200, Sandia/CA GSA Area S-300	Technician Level	7	620 sec.	90 %	Met
Non GSA Area S-300	Operations Level	5	960 sec.	90 %	Met
Non GSA Area S-300	Technician Level	7	2760 sec.	90 %	Met

**6.5.5 Observations – Technical Rescue**

None

**6.6 Response to a Second Incident**

**6.6.1 Minimum Performance Requirements**

*Respond to a second simultaneous incident of any type with a single engine company within a Total Response Time of 1240 seconds 90 percent of the time.*

**6.6.2 Performance Summary – Second Incident**

**Table 6.6.1 Performance Summary -- Second Incident**

Type Incident	Responders	Total Response Time	Performance Criteria
Second Incident	1 Company	1240 seconds	90 %

### 6.6.3 Services Provided – Second Incident

Resources for a simultaneous second incident are expected to come from mutual or automatic aid. On a large incident usually one of the units that is part of the first alarm assignment will be diverted to the second incident. If all first alarm units are already “on scene” and committed, another engine will be dispatched. With all fire department in the Livermore Valley being dispatched by ACRECC, this is a seamless operation with the next closest engine being dispatch automatically. On working full first alarm incident, dispatch will start to move companies from farther away to fill-in those stations vacated by the initial response. This makes the response time considerably better that would normally be expected. A recent example of this occurred on April 20, 2013 when all first alarm units were committed to a fire in B-322. An engine was moved-up to cover Station 20’s responses during the B-322 event.

Simultaneous events do occur and the ACRECC dispatch system provides for automatic response to additional incidents and provides for move-ups to Lab fire stations when the normal units are committed to incidents.

### 6.6.4 Performance Status – Second Incident

**Table 6.6.4 Performance Status -- Second Incident**

Type Incident	Responders	Total Response Time	Performance Criteria	Criterion Met or Not Met
Second Incident	1 Company	1240 seconds	90 %	Met

### 6.6.5 Observations – Second Incident

None.

## 6.7 Emergency Communications

### 6.7.1 Minimum Performance Requirements

*ACRECC shall provide evidence that their dispatch staff is trained to meet the qualifications of NFPA 1061 and is capable of meeting the provisions of Section 7.2 of NFPA 1221.*

*ACRECC shall provide evidence that alarms received, via telephone or alarms from LLNL’s site-wide alarm system, are answered or in the case of signals from the alarm system, acknowledged, within 15 seconds 95 % of the time and within 40 seconds 99% of the time.*

*ACRECC shall provide evidence that LLNL alarms are dispatched within 60 seconds 80% of the time and within 106 seconds 95% of the time.*

*ACRECC shall provide evidence that LLNL EMS incidents are dispatched within 90 seconds 90% of the time and within 120 seconds 99% of the time.*

*Lab Alarms shall provide evidence that alarms are transmitted to ACRECC for dispatch within 45 seconds of receipt by Lab Alarms 95% of the time.*

*ACRECC and/ Lab Alarms will notify the appropriate party within 10 minutes of a supervisory or trouble alarm 95% of the time to allow for response of appropriate personnel.*

## 6.7.2 Performance Summary – Emergency Communications

**Table 6.4.3 Performance Summary – Emergency Communications**

Event	Time Criterion	Performance
Dispatcher training	N/A	NFPA 1061
ACRECC Answer or Acknowledge Alarm	15 seconds	95%
	40 seconds	99%
ACRECC Dispatch Emergency	60 seconds	80%
	106 seconds	95%
ACRECC Dispatch EMS Emergency	90 seconds	90%
	120 seconds	99%
Lab Alarms transmit alarms to ACRECC	45 seconds	95%
ACRECC and/or Lab Alarms Notify Appropriate Party of Supervisory or Trouble Alarm	600 seconds	95%

## 6.7.3 Services Provided – Emergency Communications

LLNL monitors its fire alarm system through the LLNL Fire and Emergency Voice (FEVA) system. Alarms are transmitted via supervised telephone lines to the central processor where the alarms are processed and passed on to the Alameda County Regional Emergency Communications Center (ACRECC) for dispatch. During normal working hours (Monday through Friday 7:00 AM until 5:00 PM) the LLNL Lab Alarms desk screens alarms, with active alarms passed onto to ACRECC for dispatching. During off hours, ACRECC performs the monitoring function.

ACRECC dispatched over 90,000 incidents for consortium members during the last year. Staffing varies somewhat by season with a minimum of 7 dispatchers and a supervisor on duty at all times with additional dispatchers added during wildland season. Dispatchers receive 3 weeks of classroom training and approximately 4 months of one-on-one on the job training. All dispatchers received 48 hours of continuing training annually. This training is equal to the training provisions of NFPA 1061, *Standard for Professional Qualifications for Public Safety Telecommunicator*.

The dispatch center records all telephone and radio communications and retains those recordings for 100 days. Instant payback recorders are provided at each dispatch console. Fire alarm data is recorded by LLNL as part of their alarm system. Dispatch records are computerized and all information retained in electronic format. Fire apparatus in the ACRECC system use vehicle mounted laptops to communicate with the

dispatch center for recording enroute times, on-scene times, and when available. Alarms are acknowledged by electronics means from each station. The center is provided with redundant emergency generators and has dispatch equipment on redundant Uninterruptable Power Supplies. ALCO Fire uses the Alameda County 800 MHz trunked radio system, but responses at LLNL are operated on a federal government 400 MHz trunked system. All fire departments in the Livermore Valley operate on the County's 800 MHz trunked system allowing for seamless communications during large emergencies. LLNL emergency vehicles are equipped with radios on both the County and LLNL systems. Both systems have redundant capability in the dispatch center.

ACRECC has a comprehensive set of operating procedures, including several that are unique to dispatching and handling of alarms. During the last BNA ACRECC was in transition with some procedures carried over from when the center was operated by the LLNL Fire Department, that situation has been corrected and all procedures have been updated and converted to ACRECC procedures.

The dispatch center is operated in accordance with the operational chapters of NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications System*, including the performance requirements for call handling. A review of 43 months of dispatch data for LLNL incidents indicates the following performance to the performance criteria of NFPA 1221:

94.18% of LLNL alarms are dispatched within 60 seconds

96.8% of LLNL alarms are dispatched with 106 seconds

93.4% of LLNL EMS incidents were dispatched within 90 seconds

100% of LLNL EMS incidents were dispatched within 120 seconds

A review of alarm data from the LLNL Alarm System records indicates that answering or acknowledgement times were 89.8% within 15 seconds, 98.2% within 40 seconds, and 99.4% within 60 seconds. This performance is excellent, but could be improved by having alarms received by the alarm system "Fire" screen automatically dump into the CAD system creating a "waiting call" to be dispatched. While this acknowledgement time is slightly deficient, it does not seem to affect the dispatch times which are within the performance metric.

Trouble and Supervisory Alarms are to be reported to the "on-call" Alarm Technician who is required to respond to the Lab in 1 hour. Trouble or Supervisory Alarms that cannot be resolved within 4 hours are referred to the "on-call" Fire Protection Division representative for resolution or an authorized impairment. Responding to and making notifications of Trouble and Supervisory alarms is generally within the criterion, although there have been some glaring omissions with trouble alarms being unacknowledged for several hours. Those instances are considered anomalies and the result of dispatchers being involved in higher priority activities. There is a concern, however, that as ACRECC becomes busier, the response to the non-emergency needs of LLNL will deteriorate.

Alarms from Sandia/CA are routed to the Sandia Central Alarm Station (CAS) simultaneously with the LLNL alarm system; however, the data sent to the LLNL system is not complete for all building systems. The Sandia/CA CAS follows-up each alarm

with a phone call to ACRECC to confirm receipt of the alarm and provide the additional information. The Sandia/CA emergency phone number is also answered in the Sandia CAS; information is taken and then passed on to ACRECC for dispatch. Both of these situations cause delay in the dispatching of emergency forces, which is unnecessary. Further, the training of the Sandia/CA CAS operators is reported to be less than that required for ACRECC, an issue that may be critical during an emergency call. Sandia/CA should consider having all alarm information come directly to the LLNL system to avoid delays in alarm processing. If the Sandia CAS is serving as the equivalent of a 911 center, there is a public expectation of a certain level of service as described in NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*.<sup>iv</sup> The Sandia CAS should be upgraded by either providing the CAS operators training and procedures to meet NFPA 1221 standards or moving the function of the 911 answering point to ACRECC. If the 911 answering point is moved to ACRECC, the system can be arranged to allow Sandia CAS to monitor the calls and take over a call if it is not fire or emergency medically related.

#### 6.7.4 Performance Status – Emergency Communications

**Table 6.4.4 Performance Status Summary – Emergency Communications**

Event	Time Criteria	Performance	Criterion Met or Not Met
Dispatcher training	N/A	NFPA 1061	Met
Answer 911 phone	15 seconds	95%	Met
	40 seconds	99%	Met
Acknowledge alarm	15 seconds	95%	Not Met (89.8%)
	40 seconds	99%	Not Met (98.2%)
Dispatch Emergency	60 seconds	80%	Met (94.18.7%)
	106 seconds	95%	Met (96.8%)
Dispatch EMS Emergency	90 seconds	90%	Met (93.4%)
	120 seconds	99%	Met (99.8%)
Lab Alarms transmit alarms to ACRECC	45 seconds	95%	Met
ACRECC and/or Lab Alarms Notify Appropriate Party of Supervisory or Trouble Alarm	600 seconds	95%	Met

#### 6.7.5 Observations – Emergency Communications

1. ACRECC could improve performance on alarm acknowledgement times. While Alarm acknowledgement times slightly less than the standard, dispatch performance exceeds the criterion.
2. Sandia/CA should improve emergency alarms processing time by having the LLNL fire alarm system as their primary system, reporting all information directly to the system rather than have the CAS operator call with detailed information.

3. The Sandia/CA CAS should be upgraded by either providing the CAS operators training and procedures to meet NFPA 1221 standards or moving the function of the 911 answering point to ACRECC.

**6.8 Training and Certification**

**6.8.1 Minimum Performance Requirements -- Training**

*Qualifications are established for entry-level fire department personnel that include medical and physical performance criteria.*

*There is an established training criterion for minimum performance of entry level personnel.*

*There is an established on-going training criterion for training for incumbents.*

*There is a minimum training criteria established for fire officers or supervisors of emergency responder.*

*There is a minimum training criteria established for special operations such as hazardous materials and technical rescue.*

*There is an established program of drills and exercises at various facilities on LLNL site.*

*There are documented training records exist for each individual.*

**6.8.2 Performance Summary – Training**

**Table 6.5.2 Performance Summary - Training**

<b>Personnel</b>	<b>Performance Measure</b>
Entry level	Qualifications are established for entry-level fire department personnel that include medical and physical performance criteria.
Entry level	There is an established training criterion for minimum performance of entry-level personnel.
Incumbents	There is an established on-going training criterion for training for incumbents.
Officers	There is a minimum training criteria established for fire officers or supervisors of emergency responder.
Special Operations	There is a minimum training criteria established for special operations such as hazardous materials and technical rescue.
Drills and Exercises	There is an established program of drills and exercises at various facilities on LLNL site.
All	Documented training records exist for each individual.

### 6.8.3 Services Provided -- Training

ACFD has multiple training policies and standards, which are generally included in the 50.000 series of Official Action Guides (OAGs). As part of the ACFD Fire Recruit Academy, there is a minimum set of standards for entry level firefighter which includes two year probation. These standards are documented in the ACFD OAGs.

There are also standards for wildland firefighting, which are part of the "red card" program. It is reported that the training includes ICS 100, S-130 (Firefighter Training), S-190 (Introduction to Fire Wildland Behavior), L-180 (Potential Hazards and Human Factors on the Fire line) and S-131 (Advanced Firefighter Training). These are all part of the Recruit Academy. These standards are documented in the ALCO OAGs.

A recurring training program was established in 2006 to provide a minimum of 20 hours of refresher training and an assessment tool for all ACFD fire stations. A copy of OAG 50.009 and the 2011 and 2012 Training Plans were reviewed as evidence of a recurring training plan. The training plans are comprehensive with study guides, performance evaluations, and monthly training assignments.

Minimum qualifications for company officers include being a member of ACFD for 5 years, completion of a Task Book for Captain, completion of Command 1, Instructor 1A from the State Fire Marshal's Office, and completion of ICS 300. There is an Officer Academy and a 1-year probationary period.

There is a training program for hazardous materials and technical rescue training for those personnel in stations requiring that training. This training is documented in the ACFD OAGs.

Most of the ACFD training is done on LLNL property in the fire stations, in LLNL classroom facilities, or on LLNL roadways and parking lots. Certain evolutions require the use of a fire department drill grounds having a drill tower and/or structure fire building. ACFD uses both their own training center in San Leandro and has access to the Livermore-Pleasanton Fire Department Training Center in Pleasanton for those training evolutions. Those facilities generally meet the recommendations of the NFPA Guide to Building Fire Service Training Centers, NFPA 1402.

Drills and exercises at LLNL facilities is an important part of the emergency management program. There are extensive drills and exercises of various types are scheduled throughout the year by the Emergency Programs Division of the Emergency Management Department. During the past 3 years ACFD was involved in 19 Emergency Program's drills or exercises. In addition, the Fire Marshal has conducted a select number of specialty drills, i.e.: response to High Voltage facilities. The Emergency Programs Division drills and exercises are developed to expose the firefighters to realistic scenarios that include firefighting activities, hazardous materials activities, and emergency medical activities. The drills are scheduled on a rotating basis to emphasize hazardous materials and security events every other year. Firefighting evolutions such as laying hose, pulling hose, throwing ladders, and extending hose lines have all been part of past drills and exercises.

Special facility familiarization tours are conducted annually for all nuclear facilities and those tours are tracked in LTRAIN as Facility Briefings. These Facility Briefings are tracked in LTRAIN and ACFD monitors attendance. Any special firefighting techniques for these facilities are discussed during the briefing.

ACFD Training is tracked for each individual via a computer program that is part of the ALCO records management system. A sample of individual training records was examined. Each record contained the module completed, number of hours, and date. The Training Office does certification tracking. LLNL site specific training is tracked in LTRAIN.

#### 6.8.4 Performance Status -- Training

**Table 6.5.4 Performance Status Summary - Training**

<b>Personnel</b>	<b>Performance Measure</b>	<b>Performance Criterion Met or Not Met</b>
Entry level	Qualifications are established for entry-level fire department personnel that include medical and physical performance criteria.	Met
Entry level	There is an established training criterion for minimum performance of entry-level personnel.	Met
Incumbents	There is an established on-going training criterion for training for incumbents.	Met
Officers	Criteria established a minimum training for fire officers or supervisors of emergency responder.	Met
Special Operations	Criteria established a minimum training for special operations such as hazardous materials and technical rescue.	Met
Drills and Exercises	There is an established program of drills and exercises at various facilities on LLNL site.	Met
All	Documented training records exist for each individual.	Met

#### 6.8.5 Observations – Training

None

## 6.9 Pre-Fire Plans

### 6.9.1 Minimum Performance Requirements – Pre-Fire Plans

*Provide updates to pre-fire plans for all LLNL and Sandia/CA buildings meeting ACFD OAG 30-103 with a quarterly review frequency to ensure that they are current and accurate.*

*Provide and maintain written standard operating procedures for emergency response to occupancies with hazardous materials or other unique hazards.*

### 6.9.2 Performance Summary – Pre-Fire Plans

**Table 6.8.2 Performance Summary – Pre-Fire Plans**

Performance Measure	Frequency
Provide updates for pre-fire plans for all buildings	Quarterly
Provide written standard operating procedures for response to occupancies with hazardous materials or other unique hazards	Annually

### 6.9.3 Services Provided – Pre-Fire Plans

ACFD provides Pre-Fire Plans based on ACFD Policy, Policy 30-103 which was created to meet the LLNL Runcard needs.

LLNL Runcards consist of hanging folders that contain building plans, alarm and sprinkler zone plans, exposure maps, an emergency call out list, and a Special Information Sheet. This provides a detailed description of the contents of the building, ways to approach it, and the layout of the building and alarm zones. The “run cards” are filed in building number order in a filing cabinet in the apparatus room. Mutual and automatic aid companies have been shown the location of the run cards in case they are responding to a building without one of the “resident” companies.

The Special Information Sheets and the Emergency Call-Out Lists are maintained by the ES&H Teams and updated quarterly. Information is loaded onto a server and downloaded quarterly by the Emergency Management Department Secretary, who then passes it to the Battalion Chiefs for insertion into the Runcards.

Several audits over the past year have found areas for improvement of the run cards. Structural issues have been resolved, however timely updating of the Emergency Call Out lists is a continuing challenge. The most recent audit, conducted as part of an independent review of the Emergency Management Department by the F&I Directorate, “did not indicate the problems as identified in the [2009] BNA.”<sup>v</sup>

#### 6.9.4 Performance Status – Pre-Fire Plans

**Table 8.8.2 Performance Status Summary – Pre-Fire Plans**

Performance Measure	Frequency	Performance Criterion Met or Not Met
Provide updates to pre-fire plans for all buildings	Quarterly	Met
Provide written standard operating procedures for response to occupancies with hazardous materials or other unique hazards	Annually	Met

#### 6.9.5 Observations – Pre-Fire Plans

- Emergency Call-Out Lists and Special Information Sheets could be improved by proper quarterly review by ACFD and LLNL Fire Protection Division to ensure quarterly updates are placed in the Runcards in a timely manner.

#### 6.10 Emergency Response Apparatus

##### 6.10.1 Minimum Performance Requirements – Emergency Apparatus

*Apparatus and equipment must meet NFPA Standards for design, minimum equipment, and maintenance.*

*Provide a written replacement schedule for all emergency apparatus to allow timely replacement.*

##### 6.10.2 Performance Summary – Emergency Apparatus

**Table 6.10.2 Performance Summary – Emergency Apparatus**

Type Apparatus	Number	Comment
Engine	3	Livermore Site – 2, S-300 – 1
Aerial Ladder		Available via Automatic Aid
Ambulance ALS Configuration	2	Livermore Site – 1, S-300 – 1
Type 3 Engine	1	S-300
Type 4 Engine	2	Livermore Site – 1, S-300 – 1
Hazardous Materials	1	Responds both sites
Command	1	Battalion Chief
Reserve Type 1 Engine	1	1 Reserve per 5 in front-line service
Reserve Ambulance	1	1 Reserve per 5 in front-line service
Reserve Type 3 Engine	1	1 Reserve per 5 in front-line service
Reserve Type 4 Engine	1	1 Reserve per 5 in front-line service

### 6.10.3 Services Provided – Emergency Apparatus

As part of the contract with ACFD, LLNL remains responsible for providing emergency apparatus and equipment. Under the ACFD concept of operations each contract agency is responsible for the deployment and maintenance of their fleet of vehicles, including providing reserve apparatus. ACFD is responsible for replacement of expendables. The LLNL emergency apparatus fleet is modern, well designed, complying with NFPA standards and has been maintained per the GSA maintenance schedule. Recently, LLNL has closed its own vehicle maintenance facility, leaving DOE owned vehicle maintenance up to the users. In response to this LLNL has contracted with the ACFD Maintenance Division for routine maintenance and is sending all vehicles to their facility for repairs by training Emergency Vehicle Technicians. The following table summarizes the LLNL emergency response fleet.

**Table 6.10.3 Current LLNL Fire Department Fleet**

Year	Chassis Make	Type and Kind	Station	Scheduled Replace	Comments Replacement Cost
2010	Ford	Ambulance	20	2020	
2004	Ford	Ambulance	20	2014	Reserve/Lease
2004	Ford	Ambulance	21	2014	Lease
2005	Pierce	Hazmat	20	2025	\$500K
1998	American LaFrance	Aerial Ladder	20	2018	\$950K
2000	American LaFrance	Type 1 Engine	21	2015	\$650K
2006	Pierce	Type 1 Engine	20	2026	\$650K
2007	Pierce	Type 1 Engine	20	2027	\$650K
2003	International	Type 3 Engine	20	2018	\$350K
2004	International	Type 3 Engine	21	2019	\$350K
2004	Ford	Type 4 Engine	20	2014	Lease
2004	Ford	Type 4 Engine	20	2014	Reserve/Lease
2005	Ford	Type 4 Engine	21	2015	Lease

The design of the fleet is such that the oldest engine is being used as the first line Type 1 Engine for Station 21 where the call volume is small. There is no reserve Type 1 engine. The need for two Type 3 Engines is based upon the prescribed burn of Site 300. From a fleet management standpoint, two Type 3 engines are sufficient with one being the reserve for the other. The type 4 engines are GSA lease vehicles with skid loaded firefighting modules. Their modest cost allows maintenance of both front line and reserve vehicles.

LLNL's fire vehicle fleet has sufficient depth to provide coverage with reserve vehicles for all critical needs except Type 1 engines. ACFD has been able to provide coverage for an engine out of service due to repairs or maintenance, an advantage of contracting for service with a large regional agency, however, this service is not required and is only available when the ACFD reserves are not being used elsewhere for ACFD vehicle coverage. ACFD's position has always been that contract agencies are responsible for their own fleet deployment and capability. A Type 1 or Type 2 engine is

necessary for structural fire protection because of the ability to provide pump capacity to deploy sufficient hose lines for fire attack. Sustained attack requires flows of 1,000 gpm or more, flows that can only be reliably provided by Type 1 or 2 engines. If a Type 1 engine was out of service and no replacement could be provided by ACFD, Site 300 could be protected by the resident Type 3 engine (PTO pump capacity 500 gpm).

The need for a replacement aerial ladder is questionable. The limited need at LLNL can easily be met by units from mutual or automatic aid rather than continued purchase and maintenance of an LLNL owned unit. Now that the Livermore Pleasanton Fire Department has contracted with ACRECC for dispatch services, the dispatch of an aerial ladder via automatic aid can be done seamlessly, making that avenue for aerial ladder service very attractive. This option will be explored prior to replacement of the existing ladder, which is expected to cost nearly \$1M.

The ambulance situation is very stable with Sandia providing what is essentially the reserve ambulance via a GSA lease. One of the ambulances was replaced in 2011 by purchase of a “remount” ambulance (a reconditioned ambulance module is remounted on a new vehicle chassis) when GSA could not provide a suitable leased vehicle.

There is a five-year apparatus replacement plan that is updated annually.

NFPA standards require testing of ladders, vehicle pumps, and fire hose on an annual basis. LLNL provides ladder testing via an outside contractor, typically Underwriters Laboratory, to inspect and test all ground ladders and the aerial ladder. Vehicle pumps are tested by the ACFD maintenance shop, and fire hose is test by the fire crews.

#### 6.10.4 Performance Status – Emergency Apparatus

**Table 6.7.4 Performance Status Required First Line & Reserve Apparatus**

Type Apparatus	Number	Comment	Criterion Met or Not Met
Engine	3	Livermore Site – 2, S-300 – 1	Met
Aerial Ladder	1	Livermore Site	Met
Ambulance	2	Livermore Site – 1, S-300 – 1	Met
Type 3 Engine	1	S-300	Met
Type 4 Engine	2	Livermore Site – 1, S-300 – 1	Met
Hazardous Materials	1	Responds both sites	Met
Command	1	Battalion Chief	Provided by ACFD
Reserve Type 1 Engine	1	1 Reserve per 5 in front-line service	Not Met
Reserve Ambulance	1	1 Reserve per 5 in front-line service	Met

Reserve Type 3 Engine	1	1 Reserve per 5 in front-line service	Met
Reserve Type 4 Engine	1	1 Reserve per 5 in front-line service	Met
Apparatus Plan		Written 5 year Plan	Met
Apparatus Maintenance		Per NFPA and GSA Fleet Requirements	Met

### 6.10.5 Observations – Emergency Apparatus

1. LLNL should provide a reserve Type 1 engine to assure proper coverage in case of a Type 1 engine breakdown or is unavailable for an extended period of maintenance.

## 7.0 Status of Observations from 2009 BNA

### 7.1 Observations – Emergency Communications

1. ACRECC could improve time performance on dispatch and alarm acknowledgement times. One means of improving alarm acknowledgment times is to have the alarms received by the LLNL fire alarm system on the “Fire” screen automatically dump into the CAD system creating a “waiting call” for dispatch.

*ACTION: It was decided to gather additional data before initiating any action relative to dispatch and alarm acknowledgement times.*

*The criterion contained in NFPA 1221 has changed with regard to the Dispatch Emergency metric. The metric was changed from dispatch 95% of emergencies within 60 seconds to dispatch 80% of emergencies within 60 seconds. ACRECC easily meets the Dispatch Emergency metric, significantly lowering the importance of the Acknowledge Alarm metric. In fact, it may be the case that the alarms are being dispatched without acknowledging the alarm. Changing the system to allow LLNL fire alarms to automatically dump into the CAD system is viewed an Opportunity for Improvement and will be noted as such in ITS.*

2. ACRECC should update all policies and procedures to have a consistent and current ACRECC format.

*ACTION: At the time of the 2009 BNA the Dispatch Manager was already in the process of updating all policies and procedures. No formal action was taken pending results of the next BNA. The situation was resolved and that was noted in the December 2012 BNA and this revision.*

3. Sandia/CA should improve emergency alarms processing time by having the LLNL fire alarm system be their primary system, reporting all information directly to the system rather than have the CAS operator call with detailed information.

*ACTION: Information passed to Sandia/CA.*

4. The Sandia/CA CAS should be upgraded by either providing the CAS operators training and procedures to meet NFPA 1221 standards or moving the function of the 911 answering point to ACRECC.

*ACTION: Information passed to Sandia/CA.*

## **7.2 Observations – Pre-Fire Plans**

1. Run Card drawings could be improved by including a legend of symbols and ensuring all required building features are shown.

*ACTION: Instructions were given to ACFD to make this change to the Runcards. All Runcards received a legend page. This was completed in July 2012.*

2. Emergency Call Out Lists and Special Information Sheets could be improved by proper quarterly review.

*ACTION: ACFD committed to a quarterly review of Emergency Call Out Lists and Special Information Sheets. This process is spot checked by LLNL Fire Protection and ES&H Team. Those spot checks revealed inconsistent results and a formal review of 25 Runcards after each quarterly update was put in place May1, 2013.*

## **7.3 Observations – Emergency Apparatus**

1. Replacement of the oldest ambulance is necessary to maintain a reserve ambulance capability, a capability that ACFD does not maintain.

*ACTION: The ambulance replacement had been requested through the GSA fleet system for several years with no results. With no suitable ambulance available through the GSA fleet process a decision was made to purchase an ambulance and funding for the purchase was made a high priority in the O&B Pad for FY10. A replacement Ambulance was purchased and delivered to LLNL in September 2010.*

2. Internally, LLNL should resolve the philosophy under which it will operate the emergency vehicle fleet. Does LLNL want to have the ability to “stand alone” during a large area emergency? Is the use of ACFD reserve apparatus an acceptable risk?

*ACTION: Discussions were held within the F&I Directorate and with the O&B PAD on the need for a reserve engine and avenues to obtain a reserve engine. It was finally decided that a reserve engine was necessary and the easiest means of achieving the goal was to keep the next engine due for replacement rather than retire that engine. The 2000 American LaFrance engine currently located at Station 21 is due for replacement in 2015 and it is planned to purchase a replacement and keep the existing engine as a reserve. It is still current and can meet the criteria for a reserve engine.*

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<sup>i</sup> Lawrence Livermore National Laboratory, *Prescribed Burning/Smoke Management Plan*, UCRL-AR-154173-REV-9, March 2012.

<sup>ii</sup> Lawrence Livermore National Laboratory, Site 300 Explosive Test Facility *Prescribed Burn/Smoke Management Plan*, UCRL-AR-154174-REV-9, March 2012.

<sup>iii</sup> Alameda County Fire Department, *Controlled Burns at Site 300 Procedure*, March 2008.

<sup>iv</sup> National Fire Protection Association, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, NFPA 1221, Quincy, MA: 2013.

<sup>v</sup> Armstrong, Dennis, Emergency Management Department Program Review, Pg.18, November 30, 2012.

