LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

LLNL-PROC-412845

# Status of the Proposed Revision of the DOE USQ Guide (DOE G 424.1-1B)

M. Mitchell, J. O'Brien

May 7, 2009

EFCOG SAWG Workshop
Las Vegas, NV, United States
May 9, 2009 through May 14, 2009

**Disclaimer**

This document was prepared as an account of work sponsored by an agency of the United States government. Neither the United States government nor Lawrence Livermore National Security, LLC, nor any of their employees makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or Lawrence Livermore National Security, LLC. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States government or Lawrence Livermore National Security, LLC, and shall not be used for advertising or product endorsement purposes.

# Status of the Proposed Revision of the DOE USQ Guide (DOE G 424.1-1B) May 2009


**Mark Mitchell**

**EFCOG USQ Subgroup Chair**

**LLNL USQ SME**



**LLNL-PROC-412845**

**Lawrence Livermore National Laboratory, P. O. Box 808, Livermore, CA 94551**

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

# Outline

- Purpose of the proposed DOE G 424.1-1B
- Summary
  - Status of DOE G 424.1-1B
- Background
- Changes proposed in DOE G 424.1-1B
  - Scope of Changes
- Discussion Topics
  - Comments on the proposed DOE G 424.1-1B
  - Potential impacts

# Summary - Issue

- Revision of *DOE Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements* (DOE G 424.1-1B) drafted to address a variety of issues with the USQ Guide
- Consolidates text pertaining to PISA process into a single, unified section (an appendix)
- Addresses a variety of issues with USQ Guide as exists today
  - Evaluation of the Safety of the Situation (ESS)
  - Justification for Continued Operations (JCO)
  - PISA flow diagram with respect to 10 CFR 830.203(g)

# Summary – Discussion and Path Forward

- Concept of ESS derives from key step in USQ process for addressing a PISA in 10 CFR 830.203(g)
  - Variations arose regarding when and how to apply ESS
  - Previously, little specific guidance on expectations for ESS
- Terminology contributed to confusion on this topic
- Consequently, implementation varied from site to site, facility to facility, and sometimes within same facility over time
- DOE HSS plans to submit DOE G 424.1-1B to RevCom after this workshop (mid-May)

# Background

- ESS “invented” when DOE O 5480.21 was translated into 10 CFR 830
- PISA process must be entered when a contractor identifies or informed of situation that indicates safety analysis supporting DOE-approved safety basis may not be bounding or may be otherwise inadequate
- 10 CFR 830.203 (g) requires the following actions for a PISA:
  - Place or maintain the facility in a safe condition
  - Notify DOE of the situation
  - Perform a USQD and notify DOE promptly of the results
  - Submit the evaluation of the safety of the situation to DOE prior to removing any operating restrictions initiated as part of the first PISA action above
- 4th PISA action (ESS) is the mechanism for documenting information relevant to removal of operational restrictions
- 3rd PISA action (USQD) influences the ESS
- What is an ESS?
  - What constitutes ESS not well explained previously
  - Variations have arisen regarding how to apply this concept

# DOE’s Perspective

- DOE's perspective is that the proposed new guidance is seen as:
  - identifying an acceptable method and even more so a best practice
  - was provided to EFCOG and DOE sites to get their feedback prior to going into RevCom
  - nothing in the revised Guide relieves anyone of meeting the 10 CFR 830 requirements.
- Background
  - High on DNFSB radar screen
  - Not all sites under DFNSB but would have large impacts by the proposed changes in DOE G 424.1-1B
  - Traditionally, DOE has tried to encourage proper use of the PISA process and does want NOT to provide disincentive for declaring PISAs
  - DOE expects compliance with 10 CFR 830

# Summary of Changes in the proposed DOE G 424.1-1B

- Consolidates PISA text into a single, unified section
  - Consolidated in Attachment C
  - Text remains in the body (Section 2.4) of DOE G 424.1-1B as well
  - Moved and revised text in Attachment B
- Adds new guidance:
  - Flow diagram for PISA process
  - Recommends initial confirmatory process as part of USQ procedures
  - Timeliness of an ESS
  - DOE Approval of ESS (positive USQD)
  - ESS Purpose and Content
  - Expectations for a JCO

# Section 2.4 and Attachments B.2 and B.3

- Discovery of PISA
  - Section 2.4
    - Consolidates PISA text
    - Refers to Attachment C
  - Moves Attachment B.2 text to C.2
  - Moves Attachment B.3 text to C.4
- ESS
  - Revises Attachment B.14.3 text and moves to C.6

# Attachment B.15

- Operability Determinations
  - Add text to B.15
    - When a degraded or nonconforming SSC is identified as a PISA, the contractor must first “take action, as appropriate, to place or maintain the facility in a safe condition” (10 CFR 830.203(g)(1)). A safe condition may include continued facility operation if, although a degraded or nonconforming SSC is not be fully qualified, the impact on safe facility operations is judged to be acceptable, possibly aided by operational restrictions and the TSRs are still being met in terms of required operable equipment for the given MODE of operations and associated ACTIONS. The TSR action statement may direct the facility operator to go to a MODE in which the piece of equipment is not required or the facility operator may choose to take this action even though the TSRs do not explicitly direct it.

# Attachment C.2 – Processing Information to Determine Whether a PISA Exists

- Investigate
  - Not all conditions may be accurate or applicable
  - Appropriate to allow a short period of time (hours or days but not weeks) to investigate the conditions to confirm that a safety analysis is potentially inadequate before declaring a PISA
  - Main consideration is that the analysis does not match the current physical configuration, or the analysis is inappropriate or contains errors
  - If immediately clear that a PISA exists, or if new information is judged to have significant near term potential safety impact, then PISA should be declared immediately
- New Information (NI) Process
  - DOE Sites should consider including this initial confirmatory process as part of their USQ procedures

# Attachment C.3 – Placing or Maintaining the Facility in a Safe Condition

- What is safe?
  - Determination of what constitutes a safe condition is the responsibility of the contractor
  - Contractor should take conservative action to impose operational restrictions to ensure the facility is safe
  - Operational restrictions may include
    - Restrictions on work activities for the affected part of the facility,
    - Imposition of additional controls (e.g., fire watches if the adequacy of a fire protection control is in question), or
    - Placing the facility into a different TSR mode
  - In addition, as required by 10 CFR 830.201, the contractor must evaluate the operability of impacted safety systems and components and enter any applicable TSR actions statements
- Document rationale for determination that facility is in safe condition
  - Good practice (not required)
  - Should not involve an extensive/detailed analysis as the ESS will occur at a later stage of processing the PISA, e.g., after the USQD

# Attachment C.4 – Expeditiously Notifying DOE When Information is Discovered

- ORPS may be used
  - Old text
- Also immediately notify the DOE Facility Representative and/or other DOE management responsible for the facility
  - Good practice
- DOE notification should clearly identify any operation restrictions that were invoked to ensure the facility is in a safe condition
  - No DOE approval of the operational restrictions is needed
  - DOE should review them and can direct other restrictions be implemented if needed

# Attachment C.5 – Performing a USQD and Notifying DOE of the Results

- USQD should be performed in a short period of time (hours or days) following the determination that a PISA exist
- Positive USQD
  - DOE M 231.1-2 requires condition be categorized and reported as Significance Category 2 under ORPS Group 3 B (1)
  - Contractor must notify DOE of whether USQD positive or negative
  - Examples of notification methods may include:
    - Updating ORPS report
    - Submitting separate letter to DOE
- As part of performing USQD, new information may arise that results in contractor identifying additional operational restriction that should be imposed and modifying its operability determination
  - No DOE approval of any new operational restrictions is needed
  - DOE should review them and can direct other restrictions be implemented if needed

# Attachment C.6.1 – ESS Timing

- Timeliness of an ESS
  - Function of whether USQD positive or negative
    - ESS associated with positive USQDs should be developed within a short period of time following completion of USQD (less than a month)
    - No specific time limit for submittal of ESS
      - Positive USQD if facility is placed in a TSR safe MODE
      - Negative USQD PISA because condition of facility is such that DOE approval would not have been needed (per USQ requirements) if facility intentionally put in condition.
    - However, in accordance with 10 CFR 830.203(g), ESS must be performed prior to lifting any operational restrictions
- 10 CFR 830.203(g) lists 4 actions that contractors must perform when a PISA is discovered
  - Although nothing in 10 CFR 830.203(g) requires these actions be performed in order, it is logical and recommended that they performed in this manner

# Attachment C.6.1 – ESS with respect to DOE Review and Approval

- ESS should be reviewed by DOE to determine whether facility (with any remaining operational restrictions in place) is in a safe condition
- Negative USQD
  - No DOE approval needed
- Positive USQD
  - DOE should formally approve ESS's for PISAs that result in a positive USQD
  - DOE review of the ESS should focus on
    - Adequacy of the contractor's analysis of the impact of the PISA on the safety of the facility
    - Capability of the operational restrictions/controls to mitigate the hazards and to compensate for any potential decreases in the facility safety caused by the PISA

# Attachment C.6.1 – ESS and Positive USQD Path Forward

- If operations continue for extended period of time (i.e., greater than a month) under restricted conditions of other than a TSR safe MODE, then
  - Contractor should evaluate whether further (more detailed) analysis may be appropriate to justify that continuance
    - Justification for Continued Operation (see Section C.7)
    - Alternatively, update ESS to include more detailed analysis utilizing outline described in Section C.6.2 taking into consideration JCO content described in Section C.7 and to submit updated ESS to DOE
- Incorporate changes to resolve USQ into next annual DSA/TSR update
  - As needed
  - If not submitted earlier, or as may be specified in JCO

# Attachment C.6.2 – ESS and Positive USQD Path Forward

- Negative USQD
  - ESS documents assessment of safety of the situation
  - ESS provides evidence that immediate controls placed on the facility or activity to ensure a safe condition are not required and can be removed
- Positive USQD
  - ESS documents assessment of safety of the situation
  - ESS provides the basis for how actions taken (including implementation of operational restrictions), and/or planned actions, ensure safety
  - If DSA modification is made as part of resolution of PISA or JCO, then in accordance with 10 CFR 830.203, need Safety Evaluation Report (SER)
  - If not done earlier, then any needed changes to safety basis should be made at next annual update
- Note: Although in Attachment C.6.2, “assessment” replaced “qualitative assessment” for both negative and positive USQD cases, “qualitative assessment” preserved in C.7.

# Attachment C.6.2 – ESS Format and Content

- Title
- Description of occurrence or discovery and immediate compensatory actions taken (i.e., operational restrictions)
  - Date PISA was discovered and ORPS report number
- Results of immediate safety assessment and of USQD (positive/negative)
  - Reference relevant documents
- Results of any subsequent safety analysis developed to further support conclusions as to safety of facility with and/or without operational restrictions/compensatory measures
- Path forward
  - Discuss if additional work to be performed to resolve issue, and anticipated completion date

# Attachment C.6.2 – Additional ESS Content for Positive USQD

- Current operational status of the facility including imposed operational restrictions
- Clear identification of all operational restrictions needed to maintain the facility in safe condition
- Analysis that addresses safety impact of PISA with operational restrictions removed (or with operational restrictions in place if their removal is not proposed)
- Path forward for restoring facility into compliance with DSA (e.g., by revising DSA or by correcting discrepant condition)
- Summary of recommendations and conclusions
- Analysis
  - Should be bounding
  - Level of detail sufficient to provide confidence that facility maintained in safe condition

# Attachment C.7 – JCO

- No substantial change in reworded text
- New text for JCOs depending on PISA situation
  - Concept of timely manner (month)
  - If PISA arises from situation where analytical errors in the DSA are identified or analysis is otherwise inappropriate, proposed DSA change should be prepared and submitted to DOE
    - If DSA change cannot be submitted in timely manner (e.g., within a month) and a strong programmatic need exists to continue operations
    - JCO that defines specific operational restrictions that will be maintained should be submitted to DOE for approval
- A PISA could also arise from a discrepant as-found condition (e.g., installed equipment not meeting design specifications)
  - Facility should be restored to meet design conditions
  - There may arise situations where it may not be possible to align facility configuration with analysis in a timely manner (e.g., a month) and there may be a need to continue operations
    - JCO that defines specific operational restrictions that will be maintained should be submitted to DOE for approval.

# Attachment C.7 – JCO and the Safety Basis

- When DOE approves a JCO, JCO and associated DOE SER become temporary additions to safety basis that would permit operations to continue under specified conditions, including a defined termination point
  - DOE review of JCO should follow similar approach to approval review of DSA
- Contractor should take actions to resolve conditions that require JCO or modify safety basis during next annual update to make JCO no longer necessary
  - JCOs should not continue past a required annual DSA update unless JCO was submitted within three months of submittal date of annual update
  - If this cannot be accomplished, contractor should formally notify DOE of the reasons

# Attachment C.7 – JCO and Hazard Controls

- JCO should analyze hazards and develop controls
  - Appropriately graded for hazards associated with PISA and length of time conditions which resulted in PISA will exist
- JCO expected to define appropriate set of temporary hazard controls (that is, compensatory measures) to be in effect during life of JCO
  - In some cases, hazard controls might involve temporary changes to facility technical safety requirements (TSRs)
  - JCO intended to address emergent conditions in a timely manner; as such, associated analysis and controls/compensatory measures will usually be conservative/bounding in nature
  - Additional analysis could be performed later, in order to justify relaxation of any identified controls
  - Quality of JCO analysis should be commensurate with that of the original safety basis

# Attachment C.7 – JCO Format and Content

- Title
- Executive Summary
  - Optional, depending on length of document
- Purpose of the Document (JCO)
  - Include brief discussion on how JCO developed in accordance with site processes for meeting 10 CFR 830 safety basis requirements
- Discussion of Background
  - What condition(s) led to need for JCO
  - Note: could cite ESS which transmits JCO, or precedes it, as this material is in ESS
  - Include discussion on PISA, facility status, and steps taken (including any operational restrictions put in place) to ensure facility in safe condition
  - Discuss results of USQD

# Attachment C.7 – JCO Format and Content (cont'd)

- Compensatory Measures (Risk-reduction activities being applied immediately)
  - Provide detailed discussion of established controls or existing or planned compensatory measures
  - Discussion of how measures will be implemented and verified
- Safety Assessment
  - JCO should briefly discuss results of USQD and impact on mitigated consequence and event frequency with compensatory measures in place, and whether these risk factors are time dependent
  - Qualitative assessment of relative risk of operating facility with PISA and any compensatory measures in place as compared to risk of operating facility as analyzed in DSA should be made

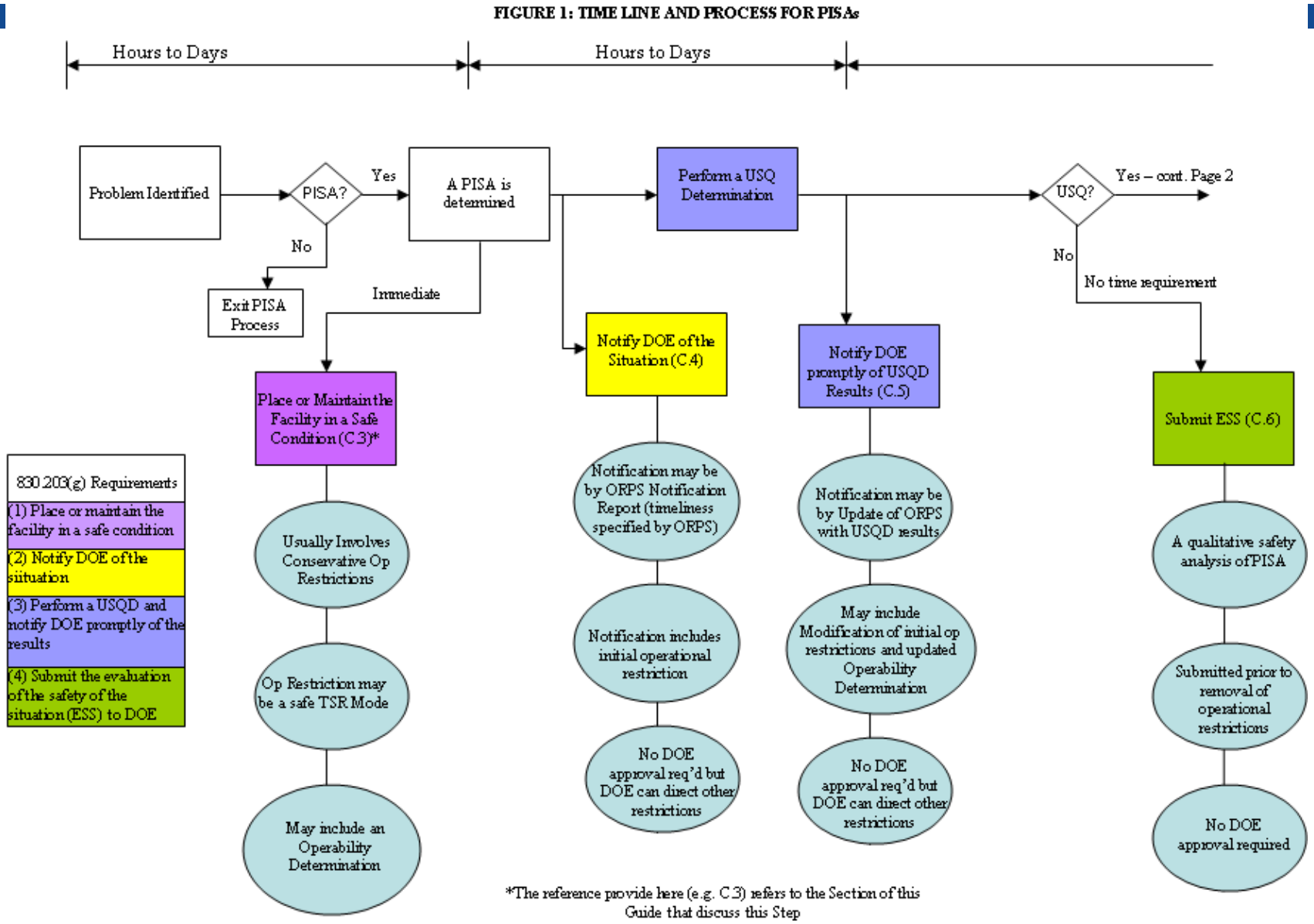
# Attachment C.7 – JCO Format and Content (cont'd)

- Planned Corrective Actions (Actions that will be developed as permanent solution)
  - Discussion of actions to take place to resolve PISA and to ensure facility can be safety operated in accordance with approved safety basis
  - Summary of recommendations and conclusions, including specific proposed path or action to terminate JCO (e.g., DSA change, restoring the facility configuration to the analysis)
- Termination of JCO (Events/date that define termination of JCO)
  - Discuss expected date or events (e.g., correction of deficiency) at which JCO will be terminated and actions/approvals necessary to terminate JCO

# Attachment C.8 – Multiple PISAs and Design Basis Reconstitution

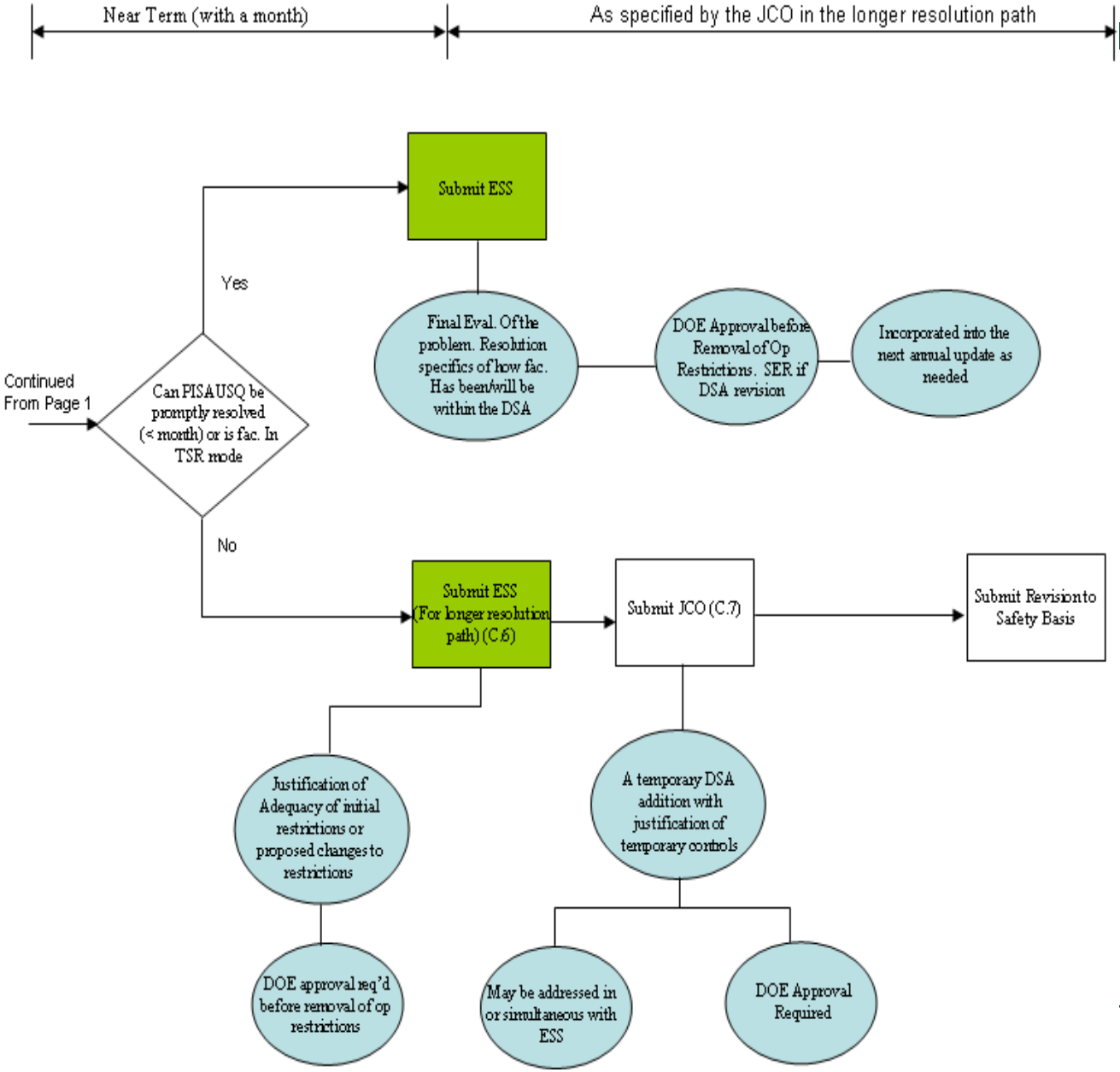
- No substantial changes to either concept

# Attachment C, Figure 1: Timeline and Process for PISAs



# Attachment C, Figure 1 (cont'd)

**FIGURE 1: TIME LINE AND PROCESS FOR PISAs**



# USQ Subgroup Teleconference Comments on DOE G 424.1-1B

- Recommendations from USQ Subgroup teleconferences
  - PISA process flow diagram attached to DOE G 424.1-1B
  - Incorporated in revisions of draft Attachment C
- Concerns from USQ Subgroup teleconferences
  - Changes in JCO expectations
  - No new requirements
    - Do not add new requirements in DOE G 424.1-1B and instead focus on implementation, rather than new requirements
    - Focus on accountability of contractors for existing requirements, rather than running to paperwork (e.g., analysis) as the answer

# Lessons Learned – Entry into PISA Process (and thus ESS) should not be judged as inappropriate contractor performance

- DOE-HQ has traditionally highlighted that DOE Site Offices should not provide disincentives for contractors to follow the PISA process
- PISA process is simply a defined mechanism for dispositioning issues that require DOE involvement
- Entry into the process should not be construed as a judgment of inappropriate contractor performance
- It is failure to properly utilize the process that may reflect on performance
- Remember, “P in PISA”
  - Potential inadequacy
- Awareness
  - Contractor and DOE Contract officials may not be aware of this when writing a Contract’s Performance Based Incentives (PBIs)

# Background

## DOE G 424.1-1A, B.14.3 PISA Requirement for ESS

- Terminology is in 10 CFR 830.203(g)(1) and (4), actions to taken in event of a PISA
  - Demonstrates adequate safety with the existing situation so that interim measures (operational restrictions) to maintain facility in safe condition can be removed
  - If that is not the case, then analysis should be accompanied by, or followed with, proposed resolution, also with safety analysis that demonstrates adequate safety
  - No specific timing expectations for this step
    - Analyses take whatever time is required
  - No specific format required
    - Should be recognized that analyses can become part of safety basis, and should be done with appropriate degree of rigor