February 11, 2011

Site Visit Report
Livermore Site Office
Safety Basis Self-Assessment

INTRODUCTION

This site visit report documents the collective results of the Office of Health, Safety and Security's (HSS) assessment of National Nuclear Safety Administration (NNSA) Livermore Site Office (LSO) safety basis processes and discusses its scope, objective, results and conclusions. Appendix A provides lists of the documents, interviews, and observations and Appendix B includes the plan for the review. The assessment was sponsored by LSO as a self-assessment and conducted jointly by HSS and LSO staff. It was completed in late 2010 and included site visits from November 29 - December 3, 2010 and December 13-17, 2010. The assessment revealed that LSO has implemented appropriate plans, procedures, and mechanisms to oversee implementation of the safety basis and unreviewed safety question (USQ) programs at the Lawrence Livermore National Laboratory (LLNL). The review identified one item for future HSS follow-up; the effectiveness of corrective actions for a November 2009 Defense Nuclear Facilities Safety Board Staff Issue Report could not be evaluated during this assessment because the update to the affected safety basis documents is not complete.

SCOPE

The scope of this self-assessment includes the plans, procedures, and processes used by the LSO to provide oversight of the safety basis and USQ processes at LLNL.

OBJECTIVE

The first objective of the self-assessment is to verify that LSO has developed and implemented oversight plans, procedures, and mechanisms to ensure that hazards associated with nuclear activities and nuclear facilities are formally and appropriately analyzed, actions are taken to prevent or eliminate hazards, and controls are developed, implemented, and verified. The second objective is to verify that procedures and processes ensure that a USQ process has been developed, approved by LSO, and adequately implemented by LLNL. Criterion 1 and 2 address the first objective and criterion 3 and 4 the second objective; criterion 5 and 6 apply to both objectives.

DISCUSSION of RESULTS

1. **LSO procedures and mechanisms address and implement 10 CFR 830 Subpart B requirements, including effective oversight of contractor performance in this functional area, including development and implementation of fully compliant documented safety analyses (DSAs) and technical safety requirements (TSRs) for hazard category 2 and 3 nuclear facilities and activities.**

Safety basis delegations to LSO continue to remain valid. A memorandum from the NNSA Deputy

Administrator for Defense Programs (NA-10) provides nuclear safety approval delegation to the LSO Site Manager, with the provision that the LSO Site Manager must obtain the concurrence of the Technical Deputy until the Site Manager completes qualification as a Senior Technical Safety Manager (STSM). The Site Manager completed her STSM qualification on July 28, 2010. This delegation applies to approval of most safety basis documents for both hazard category 2 and 3 facilities, including justifications for continued operations (JCOs), revisions to the documented safety analyses (DSAs) and technical safety requirements (TSRs), and USQ procedures. The delegation does not address approval of new safety basis documents for hazard category 2 facilities; no such documents are anticipated, so this authority is not currently needed.

The LSO Integrated Safety Management System Description and Environment, Safety and Health Functions, Responsibilities and Authorities Manual appropriately establishes the roles and responsibilities for review and approval of safety basis documentation. The LSO Manager delegates authority to act in her absence to the Technical Deputy. The Assistant Manager for Technical Services (AMTS) is assigned as the lead manager for the review and approval of the safety basis and the USQ program. The AMTS is also responsible for the LSO policy and procedure documents, provides subject matter experts to support the review teams, and recommends approval of the Laboratory's USQ procedure. The Operations Team Leader is responsible for appointment of review team leaders for the safety basis documents and oversight of LLNL's implementation of the USQ program. In addition, the Senior Technical Advisor oversees the processes and provides an independent assessment and recommendation for approval of safety evaluation reports (SERs).

LSO is actively engaged in oversight of the LLNL safety basis and USQ programs and is involved closely with LLNL in developing compliant DSAs for hazard category 2 and 3 nuclear facilities. LSO has implemented a detailed procedure, Work Instruction 421, *Review and Approval of Nuclear Safety Basis Documents*, to govern the review and approval of safety basis documents and the Laboratory's USQ procedure. The instruction covers three types of reviews: preliminary DSAs, DSAs, and TSRs. Instructions address review of annual updates, safety basis amendments (for facility modifications or at LSO's direction), and potential inadequacy of the safety analysis (PISA) submittals. The process for DSA and TSR reviews is detailed and includes, in part:

- Appointment of the Review Team Leader and assembly of the review team, including at least one safety analyst from Technical Services
- Review of the Scope and Key Issues Statement submitted by the Laboratory, which is used to establish the size and makeup of the review team
- Preparation of a review plan (per attachment 1 of the instruction)
- Participation in a facility walkthrough
- Use of checklists to ensure the completeness of the review
- Verification that 10 CFR 830 and its "safe harbor" methods are met
- Resolution of all the comments provided in the comment review records
- Preparation and transmittal of the SER, including conditions of approval when appropriate.

The review process for document changes resulting from facility modifications (amendments to the safety basis, but not new documents) is similarly well-structured. The team size and scope of the review are tailored to the scope of the amendment. The team includes a lead reviewer and supporting reviewers. The lead reviewer and safety analyst ensure that 10 CFR 830 requirements are met using an attachment that summarizes the key steps and topics that must be reviewed for potential changes. The review process also involves use of the review comment record and a thorough comment resolution process. The lead reviewer and safety analyst prepare an SER that is included with the transmittal letter to the Laboratory.

The third section of the work instruction contains steps for reviewing PISA-related submittals. A safety analyst is assigned to review the evaluation of the safety of the situation submitted by the Laboratory. Supporting steps address both negative and positive USQs and actions to be taken if LSO disagrees with the conclusion (for a negative conclusion). The analyst works with the Operations Team Leader to resolve differences in the USQ and transmit the letter to the contractor as directed by the approval authority. A positive USQ review is documented in a technical evaluation, and the documents are added to the facility's safety basis. The Operations Team Leader is also responsible for verifying that compensatory measures (or changes to compensatory measures) are in place.

The work instruction steps are supported and further delineated by a set of attachments that provide a recommended review plan format; guidance on the acceptance reviews and criteria for rejecting the submittal; a checklist against the specific requirements in 10 CFR 830 for both the DSA and TSRs; instructions for the content of the SER, which, except for the section on specific administrative controls (SACs), closely follow and expand the guidance in DOE-STD-1104; general review guidelines based on DOE-STD-1104; and guidance for review of the USQ procedure. A recently added checklist (attachment 11) includes detailed guidance to facilitate the DSA and TSR review by the subject matter experts, including checklist items for both the hazard and safety analysis chapters and the descriptions of the safety management programs. The new checklist is sufficiently detailed to ensure the completeness of the DSA and TSR.

LSO has been actively involved in the review and approval of safety basis document submittals, including annual updates and amendments, which require a significant expenditure of site office resources. The self-assessment team reviewed three SERs and determined that they provided evidence of the diligence of the review teams in conducting and documenting the reviews and providing oversight of the process. Each of the reports follows the format in the work instruction and includes a detailed discussion of the key sections of the documents. In a number of cases, the discussions highlight important issues that were raised and their resolution, such as a revision to the document or a condition of approval. The SERs clearly demonstrate the positive impact of the review team on the quality of the final documents. The reports also document the tracking and closure of a number of conditions of approval or directions provided by LSO in previous SERs. The appendices to the report include the completed checklists and review comment record forms. The comment forms provide evidence of the reviewers' attention to detail, close interaction with the DSA preparers, and verification of comment resolution. Comments are substantive, lead to improvements in the DSA, and give additional data regarding the issues raised and resolved. Conditions of approval are used to direct substantive revisions to the submitted documents and/or to direct actions for future improvements; for example, a condition of approval for the Waste Storage Facility (WSF) DSA directs that the next update improve the discussion of the adequacy of controls for the moderate and high consequence scenarios in the hazard analysis. The team members' summary biographies provide evidence of the processes by which LSO tailors the review team membership to match the scope of the safety basis changes and provide experience to newer members of the site office staff. Overall, the SERs provide a thorough discussion of the review process and the findings that support the recommendation for approval and recommended conditions of approval, if any.

Two notes were made during review of the WSF SER. First, the SER indicates that the controls in the adjacent facilities are sufficient to protect the B696 partition, but it does not indicate the nature of those controls or the mechanisms for ensuring that they remain in place (for example, a combustible control program). The adjacent facility has since been downgraded from a hazard category 3 to a radiological facility. As part of LSO's review of and concurrence in the non-nuclear safety basis document for this facility downgrade, LSO required that adequate controls remain in place to protect the segmentation assumptions. In particular, the combustible loading control was retained as a "non-nuclear laboratory administrative control," essentially equivalent to an SAC in the nuclear safety basis. These controls are protected by the non-nuclear change control process. Second, the SER does not discuss the use of

directed SACs rather than SACs in the format of a limiting condition for operation.

To gain additional insight into the implementation of the LLNL and LSO processes for developing the safety basis documents, the self-assessment team briefly reviewed the DSAs and TSRs from three facilities. The DSA and TSR at building 332, a hazard category 2 facility, are comprehensive and detailed, reflecting significant developmental effort over a number of years. The DSA and TSR for WSF, also a hazard category 2 facility, were found to contain a mostly comprehensive set of hazard and accident analyses and an appropriate set of controls to ensure the safety of the facility, though some opportunities for improvement were noted. The DSA and TSRs for the Tritium Facility, a hazard category 3 facility, were also reviewed; these documents are being significantly modified and are currently in the review process at LSO.

LSO also verifies that LLNL processes require that personnel involved in preparing safety basis documents have an appropriate level of competence. This LSO verification is incorporated into the overall LSO assessment process through the Master Assessment Schedule (MAS) and Master Assessment Plan (MAP) processes. The LSO safety basis MAP includes an element for the institutional safety basis program; the MAP elements are organized based on the nuclear facilities/activities and that program. Oversight is focused on the five nuclear facilities, one nuclear activity (onsite transportation), and the institutional safety basis program (e.g., institutional USQ program, training and qualification, staffing). The annual MAS is then used to schedule these assessments. A training and qualification review was completed last fiscal year, but the documentation is not yet complete. This year's schedule includes a review of the USQ program portion of the institutional safety basis program.

2. LSO oversight processes ensure that Laboratory procedures and mechanisms verify the effective implementation of each approved DSA, TSR, and associated controls, including SACs. Procedures provide for assessment of continued effective implementation and maintenance of all approved DSAs for nuclear facilities.

The LSO oversight program is implemented through a well-defined set of procedures. The program includes a risk-based approach to selecting assessment areas and work instructions for the conduct and follow-up of the assessments. Oversight activities include walkthrough and awareness activities, activity observations and surveillances, and functional area and team assessments. A review of completed assessments over the past two calendar years revealed that over 100 assessments or surveillances and approximately 20 functional area reviews were completed. The assessments address a range of safety basis areas, including implementation of TSRs and SACs, performance of surveillance requirement procedures, incorporation of operational controls, and review of safety systems. The completed assessments provide adequate documentation of the reviews and identify the reviewers' issues and observations.

Each of the sections in Work Instruction 421 governing safety basis approval contains a provision for the Operations Team Leader (or Senior Operations Manager for Transportation) to verify that new TSRs and conditions of approval have been implemented once implementation by LLNL is complete. LLNL has developed a new independent verification process, and LSO may accomplish its oversight by shadowing the LLNL verification team. These assessments are scheduled in the LSO fiscal year MAS. In addition, LSO oversight is assisted by an informal, internal LLNL schedule that tracks the completion of the SER for each of the safety basis documents, identifies the type of independent verification review, and tracks completion of the review. Ongoing implementation of the safety basis is discussed further under item 4, below.

3. The Laboratory has submitted, and LSO has approved, a compliant USQ process.

Attachment 10 of Work Instruction 421 contains guidance for the review of the USQ procedure, although the procedure does not specifically address the review steps. The specified criteria follow the requirements of 10 CFR 830, and criteria have been added to address training and qualification of personnel. DOE Guide 424.1-1A is used as a reference. The work instruction requires contractor evaluation of lower tier facility procedures for USQ implementation.

The currently approved revision of the LLNL USQ procedure is Document 51.3 of the Laboratory's Environment, Safety & Health Manual. The approval is based on an SER that was completed by a preparer who was supported by two additional reviewers. The SER was approved by the Technical Deputy with concurrence from the Senior Technical Safety Advisor, as required by the LSO work instruction. The SER adequately documents the review of the minor changes made to the procedure and the few significant comments that were resolved with LLNL. The reviewers generated a review comment record to document the comments and their resolution. The SER also incorporates language forbidding field changes to procedures without USQ review.

Revision 8 of the USQ procedure was approved by LSO in a memorandum sent to LLNL in August 2009. The memorandum provides approval of the document per the attached SER and directs that revisions be made to facility-specific USQ processes to clarify their use as "guidance" (only) and to specify that conflicts will default to the Laboratory procedure. This action is complete. Revision 9 of the institutional USQ procedure has been submitted and is awaiting LSO review and approval, pending completion of the current assessment of the LLNL program.

4. LSO has conducted assessments of the USQ program and found it to be effectively implemented.

Assessments of the Laboratory's USQ program are a subset of the overall LSO oversight program, which is governed by a comprehensive set of procedures and includes a risk-based approach to selecting assessment areas, as well as instructions for the conduct and follow-up of the assessments. Assessment of the USQ program is scheduled through the MAP and MAS process discussed above. Also, attachment 9 of Work Instruction 421 provides criteria and approaches for reviewing USQ determinations.

LSO conducted an assessment of the LLNL USQ program, including the Laboratory's self-assessment, in 2009. LSO personnel also conducted several activity observations/surveillances of the program, including performance of USQ determinations in 2009 and 2010. An assessment of the LLNL USQ program is being conducted in parallel with this LSO self-assessment.

In May 2009, a comprehensive review of the LLNL USQ program was conducted by a four-member team, which was led by a representative from the NNSA Service Center and included three team members (two from LSO and one from the Service Center). The review, based on a set of five criteria that incorporate the requirements of 10 CFR 830, concluded that in general the USQ process is effectively implemented. The reviewers also noted their general agreement with the recently completed LLNL self-assessment. The reviewers identified one deficiency and five observations and determined that one criterion was not met. The deficiency, which was previously identified in the LLNL self-assessment, documented the failure to evaluate programmatic operating procedures in the B332 USQ program. The criterion that was not met related to the need for LSO processes to ensure that procedure changes are appropriately entered into the USQ process.

Subsequently, LLNL prepared and submitted a corrective action plan that addressed the Laboratory self-assessment and the LSO assessment. The corrective action plan was reviewed and approved by LSO, but

the transmittal letter notes that the corrective actions would not resolve the underlying deficiencies. Consequently, as conditions of approval for the corrective action plan, LSO directed further appropriate actions by LLNL to define the boundaries of the USQ program and improve control over both programmatic and facility procedure changes. In January 2010, LLNL developed and submitted a formal list of document categories to which the USQ process applies, along with justifications for the full or partial inclusion or exclusion of many document categories from the process. LLNL also committed to a briefly described plan, including modifications to all the relevant procedures, for implementing these document categories. LSO continues to monitor LLNL's progress in completing these actions. LLNL has also developed formal lists of documents and document categories at the Superblock and WSF to which the USQ process applies. In addition, LLNL continues to complete USQ screens of procedures that had not previously been evaluated.

5. LSO has sufficient staff, and assigned personnel have adequate technical competence to oversee the performance of the contractor in this functional area.

LSO has three personnel assigned to the Safety Basis Team, each of whom has completed the Nuclear Safety Specialist qualification. An additional LSO staff member has also completed the qualification and is available to supplement the staff. The NNSA Administrator has directed that safety analysts should attend the core courses of the Safety Basis Academy over the next five years. The safety analysts have attended three of the courses, and two additional courses are planned to be held at LLNL this fiscal year.

Review teams for DSA and TSR updates and revisions are assembled by the Review Team Leader using input from the Scope and Key Issues Statement and information regarding the scope of the previous review. A typical team may include a safety basis analyst, systems engineer, fire protection engineer, health physicist, criticality safety engineer, Facility Representative, and operations team member. Specific expertise to supplement the team is also available from the NNSA Service Center. More recently, personnel from the Headquarters Office of Environment, Safety and Health Evaluations have participated in the reviews. The size and makeup of the teams is also adjusted to provide on-the-job training for junior staff members under the direction of a mentor.

The training and qualification status of the team members (primarily through the technical qualification program) is known to the Review Team Leaders and is used in choosing the team, though the members' qualifications are not formally evaluated. Work Instruction 421 requires the review team members to complete required reading, assigned by the Review Team Leader, that includes the scope and key issues, prior SERs, the work instruction, and "other pertinent documents," although review of specific review standards and guides is not specified. Review Team Leaders assign and track completion of the required reading through the ePegasus system.

6. Issues identified during previous reviews – such as the most recent Chief, Defense Nuclear Safety (CDNS) Biennial Review and selected NNSA readiness assessments and Defense Nuclear Facilities Safety Board (DNFSB) Staff Issue Reports (SIRs) – have been appropriately resolved, and adequate corrective actions have been completed or a clear path to completion is indicated.

Following the October 2008 review of LSO by the CDNS, LSO developed a corrective action plan for each of the findings and weaknesses identified in the report. The corrective actions were based on an apparent root cause analysis, and each issue was assigned an action owner and due date. Subsequently, the actions were completed and independently verified. In at least two cases – field changes to procedures and control of the LLNL USQ procedures – follow-up of the effectiveness of the corrective actions was performed and issues were re-opened when the LLNL corrective actions did not effectively address the issue. LSO has provided direction and oversight of LLNL to identify procedures that are subject to the USQ program and to ensure that these procedures are not subject to a field change process.

LSO also directed LLNL to make certain that actions to ensure that facility USQ procedures are and remain "administrative only" were complete and that changes to these procedures were adequately controlled (through review and concurrence of the Safety Basis Leader) to ensure long-term compliance. Steps to incorporate Safety Basis Leader concurrence with facility USQ procedure changes are included in revision 9 of the institutional USQ procedure, which is currently being reviewed by LSO. The Risk-Oversight Process for LSO contains a paragraph under oversight activities that explicitly addresses the need to review LLNL self-assessments as part of the LSO functional area reviews; as discussed above, assessment of LLNL training and qualification for safety basis personnel is included as a subtopic in this functional area.

In an SIR issued in November 2009, the DNFSB identified issues relating specifically to the analysis and control of hazards relevant to the Tritium Process Station and, more broadly, to the Tritium Facility safety basis. (Some of these issues had been identified earlier during the management and readiness assessments for the startup of the Process Station.) Subsequently, LLNL prepared a report that addresses each of the issues identified in the SIR. LLNL also prepared, and LSO approved, a JCO to address worker safety in the facility while the safety basis documents are revised. The LLNL JCO identified the use of tritium room monitors and the conduct of deliberate operations as compensatory measures. In its approval letter LSO directed that the use of the tritium monitors be treated as an SAC and added, as an additional SAC, the operability of the fire detection and alarm system. LSO also directed LLNL to strengthen the safety basis development, review, and approval processes. In responding to the issues, LLNL implemented a process improvement initiative for the safety basis activities in fiscal year 2009. In addition, LSO revised Work Instruction 421 to strengthen the review process, including the use of checklists specific to the DSA chapters. LLNL is in the process of revising the full Tritium Facility DSA, including a new hazard analysis and the development of a new set of controls. To ensure continuity and familiarization with the documentation, the LSO review team for the upgrade is the same team that completed the review of the DSA annual update. LSO has also assigned additional experts to the review team. The documentation has undergone review and comment resolution by the project team, and the updated DSA and TSRs were recently delivered to LSO.

CONCLUSION

LSO has appropriate plans, procedures, and mechanisms in place to oversee the implementation of the safety basis and USQ programs at LLNL. A detailed work instruction provides sufficient guidance to LSO personnel in completing structured reviews of safety basis submittals and preparing the SERs. The involvement of LSO personnel has contributed to the overall improvement of the safety basis documentation over time. The LSO work instruction also contains sufficient guidance for reviewing and approving the LLNL USQ procedure, which provides acceptable instructions for the program. LSO has established and adequately implemented processes to assess the Laboratory's implementation of DSA and TSR controls and the USQ program. In particular, over the last two years LSO has provided appropriate direction to LLNL to improve the integration of the document control and revision processes at the Laboratory with the USQ process; however, some actions by LLNL to incorporate management of these documents in LLNL- and LSO-approved processes remain open. LSO has sufficient internal and external resources available to provide the necessary oversight in this area, though considerable staff effort is required to conduct the annual reviews of the safety basis documents. LSO implemented corrective actions to address the issues identified in the last CDNS review. LSO also revised its safety basis review processes in response to the DNFSB SIR; however, the effectiveness of some of these changes cannot be evaluated until the ongoing revisions to the B331 DSA and TSR are complete.

ITEMS FOR FOLLOW-UP

The review identified one item for potential future HSS follow-up, since the effectiveness of corrective actions for a November 2009 Defense Nuclear Facilities Safety Board Staff Issue Report could not be evaluated during this assessment because the update to the affected safety basis documents is not complete.

Appendix A – Documents, Interviews, and Observations
Appendix B – Assessment Plan

Appendix A
Documents, Interviews, and Observations

Documents Reviewed:

- Livermore Site Office Integrated Safety Management System Description and Environment, Safety and Health Functions, Responsibilities and Authorities Manual, Rev. 4, 12/08
- NA-10 Memorandum Subject: Delegation of Nuclear Safety Approval Authorities to the Livermore Site Office Manager, December 9, 2008
- Work Instruction 421, Review and Approval of Safety Basis Documents, 6/3/10
- LLNL-TR-425142, Documented Safety Analysis for the Waste Storage Facilities, March 2010
- LLNL-TR-425143, Technical Safety Requirements for the Waste Storage Facilities, March 2010
- UCRL-AR-119434-06, Plutonium Facility – Building 332 Documented Safety Analysis, April 2008
- UCRL-AR-119592-06, Plutonium Facility – Building 332 Technical Safety Requirements, April 2008
- UCRL-AR-114203-06, Tritium Facility – Building 331 Documented Safety Analysis, September 2008
- UCRL-AR-132403-06, Tritium Facility – Building 331 Technical Safety Requirements, September 2008
- COR-NSI-2/11/2010-233925, LSO Memorandum to LLNS LLC, Subject: Approval of the Documented Safety Analysis and Technical Safety Requirements for the Waste Storage Facilities Annual Update (TS:100039), 6/3/2010
- Safety Evaluation Report on Waste Storage Facilities Documented Safety Analysis and Technical Safety Requirements, Rev. 0, 5/2010
- COR-LSO-6/3/2009-76345, LSO Memorandum to LLNS LLC, Subject: Livermore Site Office Review of Revision 8 of the Lawrence Livermore National Laboratory Unreviewed Safety Question Procedure (TS:090052), 8/5/2009
- Livermore Site Office Safety Evaluation Report for Revision 8 of the LLNL Unreviewed Safety Question Procedure, 8/09
- LLNL-JCO-(B331)-10-001, Justification for Continued Operations for Building 331 (B331) Tritium Facility, 3/5/10
- COR-NSI-3/5/2010-23826, Memorandum to Lawrence Livermore National Security LLC, Subject: Approval of Justification for Continued Operations for Building 331 Tritium Facility (TS: 100023), 3/17/2010
- COR-NSI-6/30/2010-264793, Memorandum to Lawrence Livermore National Security LLC, Subject: Livermore Site Office Direction Concerning Tritium Facility Documented Safety Analysis and Technical Safety Requirements, 9/13/10
- NMTP09-194, Memorandum from Lawrence Livermore National Laboratory to Livermore Site Office, Subject: Facility Manager's Evaluation of the Safety of the Situation Related to the Potential Inadequacy of the Safety Analysis (PISA) on the Tritiated Oil in Building 331, 9/19/10
- COR-NSI-12/6/2009-218049, Memorandum to Lawrence Livermore National Security LLC, Subject: Scope for the Tritium Facility Documented Safety Analysis and Technical Safety Requirements Annual Update, 12/22/09
- COR-TS-12/18/2009-220836, Memorandum to Lawrence Livermore National Security LLC, Subject: Livermore Site Office Safety Evaluation Report for the Review of the Evaluation of the Safety of the Situation Related to the Potential Inadequacy of the Safety Analysis on the Tritiated Oil in Building 331 (TS: 100015), 3/19/10
- COR-LSO-4/17/2008-76598, Memorandum to Lawrence Livermore National Security LLC, Subject:

Safety Evaluation Report for Building 332 Documented Safety Analysis and Technical Safety Requirements Annual Update (TS:080098), 11/19/2008

- Safety Evaluation Report for Documented Safety Analysis Plutonium Facility - Building 332 and Technical Safety Requirements Plutonium Facility - Building 332 Annual Update, Rev. 0, October 2008
- COR-NSI-3/23/2009-95757, Memorandum to Lawrence Livermore National Security LLC, Subject: Approval of the Annual Update of the Documented Safety Analysis and Technical Safety Requirements for Building 331 Tritium Facility (TS:090026), 3/26/09
- Safety Evaluation Report for September 2008 Annual Update to the Tritium Facility – Building 331 Documented Safety Analysis and Technical Safety Requirements, March 2009
- ASM-TS-7.15.2009-93674, WSF TSR Implementation and Compliance
- ASM-TS-7.15.2009-93685, WSF TSR Implementation/1186 Compliance
- ASM-TS-7.15.2009-93686, PATS USQ Review
- ASM-TS-7.15.2009-93708, PATS TSR Implementation/Specific Administrative Controls
- ASM-TS-7.15.2009-93716, B332 USQ Review
- ASM-TS-7.15.2009-93766, B332 CAS TSR Surveillance
- ASM-TS-7.15.2009-93799, DWTF USQ Review
- ASM-TS-7.15.2009-94403, B332 GBES Surveillance
- ASM-TS-7.15.2009-93597, Safety Basis Conditions of Approval
- ASM-TS-7.15.2009-93656, B331 USQ Review
- COR-LSO-8/3/2009-59527, Memorandum to Lawrence Livermore National Security, Subject: Implementation of the Lawrence Livermore National Laboratory Unreviewed Safety Question Process (TS: 090057), 8/14/2009
- COR-NSI-9/14/2009-134394, Memorandum to Lawrence Livermore National Security, Subject: Approval of the Corrective Action Plan for the Unreviewed Safety Question Process (TS:090086), 10/29/2009
- NMTP10-005, LLNL Memorandum to LSO, Subj: LLNL Response to LSO Direction on the Corrective Action Plan for Unreviewed Safety Question (USQ) Process Issues and Deficiencies, 1/10
- ASM-TS-6.30.2010-264747, Assessment of LLNL USQ Process
- ASM-TS-10.14.2009-205192, Review of OSP Controls
- ASM-TS-10.14.2009-205197, B331, B334, B239 WAL, and B331 Room 170 Combustible Loading
- ASM-TS-10.15.2009-205656, TSR (DF)
- ASM-NSI-10.19.2009-206525, NMTP Implementation of the Plutonium Facility Technical Safety Requirements, 5/10
- ASM-TS-10.20.2009-206757, TSR Implementation, 1/10
- ASM-TS-10.20.2009-206809, Functional Area Review of Safety Basis Issues for B695 Segment
- ASM-TS-10.20.2009-207117, Functional Area Review of B331 Safety Basis
- ASM-TS-10.20.2009-207151, WSF USQ
- ASM-TS-10.20.2009-207156, TSR Implementation
- ASM-TS-10.20.2009-207202, USQ
- ASM-TS-10.20.2009-295094, Surveillance of CAS TSR Requirement
- ISS-TS-7.15.2009-88100, Field Changes to Procedures, 5/12/20087
- ISS-LSO-7.15.2009-87841, Field Changes to Procedures, 1/27/2009
- ISS-LSO-7.15.2009-87844, Oversight of the Unreviewed Safety Question Process, 1/27/2009
- ISS-LSO-7.15.2099-87840, Explicit Requirement to Review the Contractor's Self Assessment of Unreviewed Safety Question Process, 1/27/2009
- ISS-LSO-7.15.2009-87842, Failure to Verify All LLNL USQD Procedures Consistent with Institutional Procedure, 1/27/2009
- ISS-TS-7.15.2009-88050, Failure to Verify All LLNL USQD Procedures Consistent with

Institutional Procedure, 3/5/2009
- ISS-TS-7.15.2009-87843, Inadequate Process and Procedures for Oversight of Training and Qualification Activities (Safety Basis), 1/27/2009
- Defense Nuclear Facilities Safety Board Staff Issue Report, Review of the Tritium Process Station at the Lawrence Livermore National Laboratory, 11/24/2009
- Report to the Defense Nuclear Facility Safety Board in Response to DNFSB Letter Concerning the Tritium Process Station at the LLNL, 3/20/2010
- LSO P 226.1A, Risk-Based Oversight, Rev. 1, 7/23/09
- WI 226.1.3, Performing Oversight, 8/26/10
- WI 226.1.2, Oversight Planning, 8/26/10
- List of Facility Representative Assessments, 12/2/10
- List of Safety Analyst Assessments, 12/2/10
- List of System Engineer and Operations Team Lead Assessments, 12/2/10
- LLNL Nuclear Facility DSA/TSR Update and Safety Basis Amendment Schedule (for comment), November 2010
- RHWM Procedures Applicable to the USQ Process (Waste Storage Facilities), 9/8/2010
- KLFsjb-1357, List of Superblock documents to which the USQ process is applicable, Rev. 0, 10/16/09

Interviews:

- Operations Team Lead/Review Team Leader
- Safety Basis Team Lead
- Facility Representative

Observations:

- Walkdown of WSF

Appendix B
Assessment Plan
Livermore Site Office Safety Basis Self-Assessment

SCOPE

The scope of this self-assessment includes the plans, procedures, and processes used by the National Nuclear Safety Administration (NNSA) Livermore Site Office (LSO) to provide oversight of the safety basis and unreviewed safety question (USQ) processes at the Lawrence Livermore National Laboratory (LLNL).

OBJECTIVE

Verify that LSO has oversight plans, procedures, and mechanisms in place and implemented to ensure that hazards associated with nuclear activities and nuclear facilities are formally and appropriately analyzed, actions are taken to prevent or eliminate hazards, and controls are developed, implemented, and verified. Verify that procedures and processes ensure that a USQ process has been developed, approved by LSO, and adequately implemented by the Laboratory.

CRITERIA

1. LSO procedures and mechanisms address and implement 10 CFR 830 Subpart B requirements, including effective oversight of contractor performance in this functional area. (DOE-STD-1104-2009, DOE O 226.1A, NNSA FRAM, and NA-1 SD 226.1A)

    - LSO ensures that Laboratory processes and mechanisms for preparing and submitting fully compliant documented safety analyses (DSAs) for hazard category 2 and 3 nuclear facilities are established and effectively implemented. (10 CFR 830 Subpart B)

    - LSO procedures and mechanisms verify that Laboratory processes require appropriate competence through education, training, experience, and qualification for those personnel responsible for preparing DSAs, technical safety requirements (TSRs), and USQ documents. (10 CFR 830 Subpart B)

    - Safety basis delegations continue to remain valid and satisfy delegation criteria. (BOP-10.002)

2. LSO oversight processes ensure that Laboratory procedures and mechanisms verify the effective implementation of each approved DSA, TSR, and associated controls, including specific administrative controls (SACs). Procedures provide for assessment of continued effective implementation and maintenance of all approved DSAs for nuclear facilities. (10 CFR 830 Subpart B)

3. The Laboratory has submitted, and LSO has approved, a compliant USQ process. (10 CFR 830 Subpart B, NNSA FRAM)

4. LSO has conducted assessments of the USQ program and found it to be effectively implemented. (10 CFR 830 Subpart B, NNSA FRAM)

5. LSO has sufficient staff and assigned personnel have adequate technical competence to oversee the performance of the contractor in this functional area. (NA-1 SD 411.1-1C)

6. Issues identified during previous reviews [e.g., the most recent Chief, Defense Nuclear Safety (CDNS) Biennial Review and selected NNSA readiness assessments and Defense Nuclear Facilities Safety Board (DNFSB) staff issue reports] have been appropriately resolved and adequate corrective actions have been completed or a clear path to completion is indicated. (DOE O 226.1A, NA-1 SD 226.1A)

REFERENCES

- 10 CFR Part 830, *Nuclear Safety Management,* Subparts A and B
- DOE O 226.1A, *Implementation of DOE Oversight Policy*
- DOE O 420.1B, *Facility Safety*
- DOE-STD-1104-2009, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*
- NA-1 SD 411.1-1C, *NNSA Safety Management Functions, Responsibilities and Authorities Manual (FRAM)* (NNSA FRAM)
- NA-1 SD 226.1A, *NNSA Line Oversight and Contractor Assurance System Supplemental Directive*
- BOP-10.002, *Delegations of Nuclear Safety Authority*

APPROACH

<u>Document Reviews</u>:

1. Review LSO plans and procedures for oversight of the Laboratory's activities and procedures for developing, submitting, implementing, and maintaining nuclear safety basis documentation and programs for nuclear facilities. Review LSO plans for review of LLNL safety basis documents and records of reviews from recent submittals, including safety evaluation reports (SERs). Determine whether:
    - LSO personnel are assigned responsibility to verify the adequate development of Preliminary DSAs for new nuclear facilities or major modifications to nuclear facilities.
    - LSO personnel are assigned responsibility to review and approve the DSAs/TSRs prepared by the Laboratory for hazard category 2 and 3 nuclear facilities/activities.
    - Evaluation criteria have been developed and implemented to govern LSO reviews. Verify the criteria ensure that the analysis provided by the contractor:
        - Properly covers the hazards associated with the work,
        - Adequately traces the hazards identified to the control selected to address the hazard, and
        - Identifies adequate safety functions, performance characteristics, and functional requirements to ensure an adequate degree of safety.

- The LSO criteria for evaluating the classification of nuclear safety structures, systems, and components are appropriate and utilized during the review of DSA submittals.
- Associated SERs for nuclear facilities meet the applicable standards. For example:
  - SERs meet the guidance in DOE-STD-1104-2009.
  - SERs are submitted to the approval authority (LSO Manager or Cognizant Secretarial Officer depending on delegation).
  - Safety basis approval delegations are valid and up to date.
- LSO personnel have assessed the Laboratory's processes for assigning trained and qualified personnel to develop and/or revise safety basis documentation. Verify that assessments address the sufficiency and technical experience and qualification of the Laboratory staff who manage, develop, and review nuclear safety basis documentation in compliance with 10 CFR 830 Subpart B.

2. Review LSO plans and procedures governing the assignment of personnel to verify continued implementation of approved DSAs, including any conditions of approval in SERs. Review records of completed reviews and oversight activities, as required. Examine whether:
   - LSO personnel are assigned responsibility for assessing continued effective implementation of all approved DSAs and TSRs for nuclear facilities, including all associated controls and initial conditions.
   - LSO personnel are assigned responsibility for assessing DSA annual updates and DSA and TSR change control and for overseeing the Laboratory's USQ process.
   - LSO properly reviewed and responded to any positive USQ determination (USQD)-related requests for approval or evaluations of the safety of the situation.

3. Review LSO plans and procedures for review and approval of the Laboratory's USQ program. Examine the records of the LSO review and approval.

4. Review LSO assessments of USQ program implementation.

5. Review LSO training and qualification records pertaining to the competence and assignment of personnel who implement processes and oversee activities associated with nuclear safety basis implementation in compliance with 10 CFR 830 Subpart B. Review personnel assignments and vacancies. Review the schedules for DSA and TSR submittals and functional area assessments and verify sufficient personnel are available to support this functional area.

6. Review the corrective action plan and closure files or action plans from the previous CDNS review, selected readiness assessments, and DNFSB staff issue reports. Verify that issues have been resolved and corrective actions implemented, validated, and verified or that a clear path to resolution is in place.

Interviews:

1. Interview LSO personnel responsible for oversight of the Laboratory's safety basis and USQ programs.

2. Interview LSO safety basis review team leaders and team members.

3. Interview Facility Representatives.

4. Interview LSO personnel responsible for acting on positive USQD-related requests for approvals.

Observations:

As available:

1. Observe interactions between the LSO Managers, Safety Basis Review Team leaders, Safety Basis Review Team members, and Laboratory safety basis staff.

2. Observe LSO oversight of Laboratory implementation of DSA and TSR requirements, including surveillances and assessments.