Report to the

Defense Nuclear Facilities Safety Board

in Response to

Defense Nuclear Facilities Safety Board Letter Concerning the Tritium Process Station at the Lawrence Livermore National Laboratory

National Nuclear Security Administration

Prepared by

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EXECUTIVE SUMMARY

The staff of the Defense Nuclear Facilities Safety Board (DNFSB) observed the readiness assessment (RA) led by the National Nuclear Security Administration (NNSA)/Livermore Site Office (LSO) for startup of the Tritium Process Station (TPS) at Lawrence Livermore National Laboratory (LLNL) and reviewed related aspects of the Tritium Facility Building 331 (B331) safety basis and operational activities in September 2009. The NNSA RA team identified two findings, which were categorized as post-start issues: (1) designating the TPS glovebox as a safety-significant control without derivation of this control from the hazard analysis has led to confusion about the functional requirements and controls for the glovebox, and (2) the operating guidance for the glovebox did not meet the intent of Department of Energy (DOE) Order (O) 5480.19, *Conduct of Operations Requirements for DOE Facilities*. Expanding on the two RA findings, the DNFSB sent NNSA a letter regarding the B331 TPS dated January 27, 2010 (Reference 1), documenting concerns that the hazard analysis for TPS may not have adequately characterized the consequences of fire scenarios involving tritium, nor identified the appropriate safety-significant controls to protect facility workers. The letter additionally included other Conduct of Operations issues independently identified by DNFSB staff. The DNFSB letter acknowledged LSO had already directed LLNL in a December 22, 2009, letter (Reference 2) to resolve a number of issues with the B331 safety basis, including those identified with TPS.

In Reference 1 DNFSB requested a report and briefing within 60 days addressing the deficiencies identified by the Board's staff and the NNSA RA Team regarding the analysis and control of hazards both for TPS and more broadly in the Tritium Facility safety basis, as well as the deficiencies identified in the conduct of operations for TPS. LSO and LLNL provided a briefing to the DNFSB on February 26, 2010, providing an initial response to the DNFSB concerns, and describing completed and future actions improving the conduct of operations for TPS and the B331 safety basis through a re-evaluation of the B331 Documented Safety Analysis (DSA) hazard analysis. This report provides formal responses to the specific DNFSB concerns documented in Reference 1.

As a result of discussions between DNFSB, LSO, and LLNL on February 26, 2010, LLNL submitted a Justification for Continued Operations (JCO) for LSO approval establishing hazard controls (i.e., compensatory measures) limiting potential facility worker risk for the scenarios of concern until a revised safety basis can be prepared, approved, and implemented. The JCO submitted by LLNL is Attachment 1 to this report. The JCO compensatory measures include controls to ensure operable tritium room monitors and additional operations oversight by the LLNL Nuclear Materials Technology Program (NMTP) that operates B331. The controls for tritium room monitors routinely ensure they are functioning, and specifically prior to commencing any tritium processing operations for a given room, to mitigate the consequences of tritium releases, and include periodic surveillance of airflow and alarms to ensure operability. The additional operations oversight by NMTP is termed Deliberate Operations in the JCO with the purpose of reinforcing implementation of safety controls, adherence to good conduct of

operations practices, and compliance with procedures. However, the JCO does not include a detailed definition of Deliberate Operations. Deliberate Operations was proposed to apply to the TPS, the Tritium Science Station glovebox, tritium recovery operations using a large-scale commercial grinder, and legacy waste disposition activities. At this time, the TPS and the commercial grinder are not operational, but they are planned for operation this fiscal year after completion of a start-up plan required by DOE O 425.1C.

LSO approved the JCO on March 17, 2010 (Attachment 2). Recognizing the compensatory measures for tritium room monitors included current B331 requirements to ensure operability of tritium room monitors, LSO directed these controls be elevated in importance and treated as Technical Safety Requirement (TSR) Specific Administrative Controls. LSO considered Deliberate Operations during its review and encouraged continued LLNL management involvement in all pertinent activities including start-up and on going operations. LSO's approval of the JCO required an additional compensatory measure that ensures the availability of an operable fire detection and alarm system in the B331 Radioactive Materials Area (RMA) by elevating this requirement to a TSR Specific Administrative Control. The fire detection and alarm system sounds an alarm if excessive heat or smoke is detected in the facility and protects workers by detecting fire at an early stage and initiating an evacuation. LLNL and LSO have also strengthened their safety basis development, review, and approval processes, and LSO will provide additional facility representative oversight of B331.

PURPOSE

This report responds to the DNFSB letter (Reference 1) of January 27, 2010, regarding the TPS at LLNL with the overarching purpose to communicate the path forward that will resolve the safety basis and conduct of operations issues, thereby ensuring continued safe operations in B331. The DNFSB summarized in their letter that a number of significant open issues existed regarding the TPS related to hazard analysis, selection of controls, and conduct of operations, including two post-start findings identified by the NNSA RA for TPS that also concerned the TPS safety basis and conduct of operations. In the report attached to Reference 1, DNFSB staff documented the following overall concerns related to the TPS safety basis and conduct of operations.

Safety Basis: "Based on its review of the safety basis for TPS, the staff is concerned that the hazard analysis may not have adequately characterized the consequences of fire scenarios involving tritium nor identified the appropriate safety-significant controls to protect facility workers."

Conduct of Operations: "LLNL does not use a comprehensive set of formal operating procedures to govern the TPS system operations. Rather, facility operations are accomplished through a combination of general-use procedures in conjunction with operator aids. Operators interpret the needs of facility customers based on requirements outlined in 'execution plans' and develop a conceptual idea of the most efficient transfer route and method. The transfer route is marked with a grease pencil on a laminated copy

of the system diagram, and this operator aid is used to develop the tritium-at-risk calculation described above as well as to guide the necessary system alignments. The staff noted that there were no formal review or approval mechanisms associated with the development of the required flow paths or system alignments. The staff questioned whether the observed operating practices were of sufficient rigor to control operations."

This report: (1) provides background information concerning the LLNL Tritium Facility; (2) summarizes the response to the two LSO RA post-start findings for TPS; and (3) responds to specific issues in the DNFSB staff report attached to Reference 1. This report describes how the compensatory measures submitted by LLNL in the JCO (Attachment 1) and approved by LSO (Attachment 2) provide additional assurance to LSO regarding adequate protection of the facility worker until approval and implementation of the revised B331 safety basis and resolution of the conduct of operations issues.

BACKGROUND

The Tritium Facility, B331, recently completed a major modification to the facility known as the Tritium Facility Modernization Project (TFM) a line item project costing approximately thirteen million dollars. This project added a 2,200 square foot metal pre-fabricated building to B331 and renovated 3,100 square feet of laboratory floor space. TFM modernized the tritium handling capabilities of B331 through installation of new tritium operating stations and gloveboxes. The laboratory areas are used primarily for research and development work with isotopes of hydrogen gas and metal hydrides in contained beds. B331 operations include fabrication and fill of targets destined for experiments in the National Ignition Facility, tritium recovery and recycling, and Type B shipping container inspection and recertification.

A Preliminary DSA for TFM was submitted by LLNL and approved by LSO in June 2006, prior to approval of Critical Decision 3B in September 2006 for start of construction. A safety basis amendment for TFM was approved in November 2008; the subsequent annual update of the B331 DSA and TSR incorporating the safety basis amendment was approved in March 2009. During these reviews, questions arose pertaining to hazards analysis and controls, while TPS incurred a number of design changes, and while the formal System Design Description for TPS was incomplete. In each case a similar hazard analysis was submitted for the TFM project. In each case the gloveboxes were established as safety-significant barriers consistent with historical practices that pre-dated the TFM DSA submittals and related Safety Evaluation Report approval documents. LSO considered, consistent with past practice, that designating the tritium gloveboxes as safety-significant controls provided an additional defense-in-depth measure to ensure in the event of a tritium leak, the glovebox would further limit facility worker consequences. LSO considered the safety-significant designation of these controls to be within its prerogative as permitted under 10 CFR 830, Subpart B, Section 830.202. As a result, unique controls without the benefit of final TFM glovebox design and use were put in place to reduce operational risks but preserve the flexibility required by a research and development program.

In late 2009, LSO identified a number of technical issues with the B331 DSA based on concerns identified from the LSO TPS RA, LLNL RA for the commercial grinder, and ongoing legacy waste disposition activities. Discussions with DNFSB staff on similar issues were also on going at this time. In December 2009, LSO issued a letter (Reference 3) directing LLNL to request concurrence from LSO before starting commercial grinder operations to ensure that pre-start findings from the LLNL RA are resolved. Also in December 2009, LSO issued a letter (Reference 2) directing LLNL to provide a revised hazard analysis and controls derivation to resolve the identified issues. Accordingly, LLNL proposed a schedule in Reference 4 to re-baseline the hazard analysis to ensure consistent and complete flow down of controls and to clearly reflect unmitigated facility worker consequences and risks. This effort will be based on the actual materials and operational flows documented as being handled in any given process and consider process operational upsets. This will ensure that controls are adequately derived from the hazard analysis, and appropriately protected in the TSRs. The LLNL schedule to re-baseline the hazard analysis and control flow down was approved by LSO in Reference 5 and will be submitted to NNSA/LSO no later than June 30, 2010.

In the interim, based on discussions between DNFSB, LSO, and LLNL, LLNL has provided a JCO to document additional temporary hazard controls (i.e., compensatory measures) to further limit potential facility worker risk. These compensatory measures provide additional assurance to LSO regarding adequate protection of the facility worker until approval and implementation of the revised B331 safety basis. As approved by LSO these compensatory measures provide TSR level controls protecting facility workers.

LLNL submitted the JCO to LSO on March 5, 2010 (Reference 2), identifying four compensatory measures. Three of the compensatory measures credit tritium room monitors and ensure the availability of operable monitors to detect and alert facility workers to tritium releases. The tritium room monitors mitigate facility worker consequences by alerting workers to a release of tritium (resulting from a spill or fire) thereby prompting facility workers to leave the affected room and minimizing exposure time, in accordance with the B331 Facility Safety Plan. The final compensatory measure was proposed in the JCO to increase management involvement via Deliberate Operations for TPS, Tritium Science Station, commercial grinder, and legacy waste operations. LSO considered Deliberate Operations during its review and in its response encouraged continued LLNL management involvement in all pertinent activities including start-up and on going operations. LSO's approval of the JCO required an additional compensatory measure that ensures the availability of an operable fire detection and alarm system in the B331 RMA. The fire detection and alarm system protects workers by detecting fire and alerting workers to the fire to initiate an evacuation. The fire detection and alarm system is a preventive and mitigative control for protection of facility workers. The JCO approval letter elevated these previously existing equipment important to safety items (tritium room monitors and fire detection and alarm system) to TSR Specific Administrative Controls. LSO approved the JCO on March 17, 2010. LLNL's JCO and the LSO approval letter are Attachments 1 and 2 to this report.

LIVERMORE SITE OFFICE READINESS ASSESSMENT FINDINGS

LSO RA Finding 1: LSO designation of the TPS glovebox as a safety-significant control without an established basis has led to confusion on what the functional requirements for the glovebox are and how they should be controlled and maintained (i.e., interfaces, boundaries, etc.). The hazards associated with the operations should be well known and analyzed prior to control selection and designation.

RA Response 1: The gloveboxes were established as safety-significant barriers consistent with historical practices that pre-dated the TFM DSA submittals. LSO considered, consistent with past practice, that designating the tritium gloveboxes as safety-significant controls provided an additional defense-in-depth measure to ensure in the event of a tritium leak, the glovebox would further limit facility worker consequences. As the result of the RA, LSO has directed LLNL to submit a safety basis amendment that ensures the control set is properly derived from the hazard analysis for the TPS, or to provide a technical justification for removing the safety-significant designation for the TPS glovebox. LLNL is resolving this issue in the revised hazard analysis and control flowdown to be provided to LSO by June 30, 2010. This qualitative evaluation will result in the derivation of material operating limits, identification of safety-significant Safety Structures, Systems, and Components (SSCs), and associated functional requirements and performance criteria. A basis for each control will be included. In the interim, the compensatory measures approved by LSO will provide for added worker protection by detecting and alerting facility workers to tritium releases from the glovebox.

LSO RA Finding 2: LLNL NMTP Conduct of Operations Manual, Section 17.1 requires that procedures be written and developed in accordance with NMTP-PMP-001, Review and Approval of Programmatic Procedures. The use of an Operational Safety Plan (OSP) with attached operating guidance does not meet the intent of procedures as defined by DOE O 5480.19.

RA Response 2: NMTP is changing the relevant OSP and the attached operating guidance such that the attachments will meet the expectations for a procedure per DOE O 5480.19. NMTP is also revising the procedure that governs OSP development and implementation to address expectations for procedures that are appended to OSPs. The Conduct of Operations Manual has also been revised to reference the correct NMTP procedures that govern preparation of procedures and OSPs. See responses to Staff Report Issues 4 and 7 below for additional information.

DNFSB STAFF REPORT ISSUES

Safety Basis – Hazard Analysis

Staff Report Issue 1: The safety function of the TPS glovebox is described in the LSO-approved DSA as providing a safety-significant passive barrier when processing involves 600 Curies (Ci) or more of tritium. There is not a fully developed technical basis associated with the 600 Ci threshold limit, so it has not been demonstrated that allowing the processing of tritium up to this threshold without a credited barrier provides adequate protection for facility workers.

Response 1: The 600 Ci value represents approximately 4% of the DOE-Standard (STD)-1027-92 Hazard Category 3 threshold for tritium, thereby indicating that this amount does not rise to a level requiring designation of safety SSCs to protect workers. For this amount of tritium, LLNL derives controls appropriate to address the hazards to facility workers through the Radiation Protection Program in conjunction with the Work Control Process. This process identifies the appropriate type of workstation to be used for performing the work depending on the quantity and nature of the material. The 600 Ci value is more than an order of magnitude less than similar allowances for other NNSA tritium facilities. The revised DSA will provide adequate bases for all limits/thresholds used in developing the hazard analysis. These limits and any other credited controls will be derived from the radiological consequences from exposure to tritium.

Staff Report Issue 2: It does not appear that the hazards associated with the maximum inventory of the TPS glovebox of 30 grams of tritium (approximately 290,000 Ci) have been adequately assessed. It is not clear that it is legitimate for the safety basis to exclude the full 30 gram inventory from consideration for glovebox operational events. Overall, the staff questions whether the hazard analysis adequately characterizes the consequences of tritium release scenarios and identifies the appropriate safety-significant controls to protect the facility workers. In particular, the accident scenario involving a fire with the potential to fully oxidize and release the 30 gram inventory appears to be inappropriately controlled.

Response 2: The B331 DSA hazard analysis used generic bounding scenarios and consequently lacks clarity in some instances. The hazard analysis includes spill and fire events that analyze releases of a Material-At-Risk (MAR) of up to 30 g, but the construct of the DSA obscures this fact. This is particularly true for fire scenarios where the hazard analysis relies heavily on crediting initial conditions that limit the impacted MAR and, therefore, gives the appearance of underestimating unmitigated consequences (e.g., use of the hydrogen species limit and tritium storage vessel design and pressure control as initial conditions).

For the collocated worker at 100 meters, modeling performed by LLNL as part of the LSO comment resolution for the DSA annual update demonstrated that for an unmitigated fire scenario involving 30 grams of tritium (assumed to be completely converted to tritium oxide and released at ground level) resulted in low worker

consequences that did not challenge the DOE–STD-1189-2008, *Integration of Safety into the Design Process*, guideline of 100 rem for safety-significant control designation.

In estimating facility worker consequences from a release of 30 grams of tritium, the safety analysts recognized that spill scenarios would involve only a small percentage of tritium oxide and the subsequent conversion of tritium to tritium oxide was a slow process occurring over many hours. For large tritium releases involving fires, complete conversion from tritium to tritium oxide was assumed to occur as soon as tritium vessel integrity was compromised by the fire. However, such a breach was not expected to occur until the magnitude of the fire had increased to sufficient size (large fire) because of the pressure control (credited initial condition preserved in the TSR) and design (equipment important to safety) for the vessels. It was assumed that the natural (unmitigated) facility worker response to a large fire was immediate evacuation; thus removing the facility worker from the imminent hazard of a large release. Failure to evacuate (with or without a tritium release) would likely result in significant injury or death from the fire.

Because the unmitigated facility worker consequences were estimated to be low for the large release events described above, safety-significant controls were not deemed necessary to be carried forward as TSR controls – i.e., not derived from the qualitative hazard analysis. However, LSO considered that designating the tritium gloveboxes as safety-significant provided an additional defense-in-depth measure to ensure that in the event of a tritium leak the glovebox would act to limit the egress of tritium and tritium oxide to the extent that facility workers would not receive any significant doses. Accordingly, the tritium gloveboxes are functionally required to prevent the uncontrolled release of tritium, and this function is verified by satisfying performance criteria measured in a pressure rate-of-rise test. LSO considered the directed safety-significant designation of these controls to be within its prerogative as permitted under 10 CFR 830, Subpart B, Section 830.202.

LSO concurs that the hazard analysis does not clearly describe the unmitigated consequences from tritium releases and has directed LLNL in Reference 2 to revise the hazard analysis and re-evaluate unmitigated facility worker consequences. The direction to revise the hazard analysis, including re-evaluating facility worker consequences and credited controls, extended beyond TPS and addresses the more global hazard analysis and control flowdown concerns identified by the DNFSB staff report. In the interim, pending approval and implementation of the revised DSA/TSR, the compensatory measures in the JCO and associated LSO approval letter (Attachments 1 and 2) will ensure the availability of operable tritium room monitors and fire detection and alarm system by elevating these controls to TSRs. These controls detect and alert facility workers to tritium releases and fires, thereby ensuring timely evacuation and preventing/mitigating consequences to the facility workers.

Staff Report Issue 3: The LSO RA team documented a finding against LSO that mirrored the staff's concern regarding hazard analysis and selection of controls; this finding was characterized as a post-start issue. Of note, this same issue was previously identified during both the contractor's RA and the management self-assessment. The

LSO-approved corrective action for this finding is to direct LLNL to either submit a safety basis modification that ensures the development of appropriate TSRs from the hazard analysis or provides justification for not implementing safety-significant controls. This action is expected to coincide with the next annual update of the safety basis, expected in March 2010. This corrective action does not appear to address the global weaknesses associated with the hazard analysis or address the weaknesses in the LSO safety basis review and approval process that resulted in the finding against LSO.

Response 3: The resolution to the more global weaknesses associated with the hazard analysis is discussed under Response 2 above. The LSO safety basis review and approval process is documented in an LSO Work Instruction that implements DOE-STD-1104-2009, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*. LSO is improving the safety basis review and approval process through development of a revision to the Work Instruction, which better describes the expectations for the review process as a whole and specifically for the review team; this revision is scheduled to be complete by April 30, 2010. In addition, in Fiscal Year 2009, LLNL with LSO participation underwent a formal process improvement project for DSA annual updates. Process improvements included an agreement by LLNL to develop scope and key issues statements in advance of major safety basis submittals that are agreed upon by LSO and LLNL. This provides a venue for LSO and LLNL to discuss potentially controversial issues and allows LSO to tailor the review team composition to address the specific changes proposed by LLNL. The same review team will review both the B331 DSA and TSR annual update due to LSO on March 26, 2010, and the follow on safety basis amendment due to LSO on June 30, 2010. The review team will include additional expertise compared to the previous review team, including a senior facility representative currently assigned by LSO to oversee operations at the LLNL Plutonium Facility, a health physicist, and a Certified Professional Engineer performing safety system oversight for LSO.

Safety Basis – Identification and Implementation of Controls

Staff Report Issue 4: From an operational perspective, the DSA requirement to avoid inadvertently transferring more than 600 Ci of tritium outside the TPS glovebox is implemented through an informal calculation using a number of system operating and design parameters (e.g., pressures, pipe volumes), to determine the amount of tritium at risk for a given operation. The calculation drives a number of subsequent system alignments and process steps. The calculation is invoked by Attachment 2 of LLNL OSP No. 331.099, step 5.12.2.8, by a direction to "determine required manifold pressure." The operators interpret this step of the general-use procedure as a direction to perform a MathCAD® calculation using an unverified algorithm that determines the amount of tritium to be transferred during the operation. Following this theoretical calculation, the operators perform the necessary valve and system alignments to conduct the transfer. However, since the actual system pressures may vary slightly from the theoretical values determined from the calculation, the operators must recheck that the 600 Ci limit was not exceeded by adjusting the values using a hand calculation. Neither the initial calculation nor the re-verification steps are controlled by formal operating procedures. Further, it is not clear that the calculation adequately addresses whether additional tritium might be at

risk by taking the credited control boundaries into consideration. As a result, no credited (safety-significant) SSCs or specific administrative controls are in place to ensure that the 600 Ci limit is not exceeded.

Response 4: The current practice is for an independent hand calculation to be used to check the MathCAD® calculation for determining the curie content of the material at risk in the glovebox before opening valves to allow the tritium to be processed (e.g., transferred to a National Ignition Facility target vessel) in the hood. A formal operating procedure is being developed to ensure the proper execution for inventory calculations including appropriate use of MathCAD® and ensuring the MathCAD® results are verified by hand calculation.

LSO will provide additional facility representative oversight of B331 to oversee procedural compliance and implementation of controls. To provide this additional oversight, the primary B331 facility representative will be relieved of certain duties unrelated to B331. In addition, the senior facility representative assigned to the Plutonium Facility has recently completed qualification for B331 and will assist the primary B331 facility representative. LSO also has a facility representative in training for B331.

Staff Report Issue 5: Failures of the programmable logic controller (PLC) are not explicitly considered in the hazard analysis, likely because the hazard analysis was not derived from a process-specific approach for TPS. As a result, the consequences of a failure are not characterized, the PLC is not identified as a safety-significant SSC, and its associated software is subject to the lowest category of software quality assurance.

Response 5: The revised hazard analysis will consider specific process operational failures and will derive controls accordingly. This includes a re-evaluation of the safety SSCs including associated sub-systems functional requirements and categorization. In the interim, the compensatory measure identified in the JCO will provide for added worker protection by detecting and alerting facility workers to tritium releases from the glovebox regardless of the initiating event (e.g., PLC failure).

Staff Report Issue 6: TPS is equipped with bubbler devices for both overpressure and underpressure protection, which are identified as a defense-in-depth feature. The TPS bubbler assembly lacked permanent markings to indicate the appropriate oil levels for normal and abnormal conditions. Given the pressure protection function provided by the bubblers, it is not clear why they were not formally credited as a safety control.

Response 6: Permanent markings have been added to the bubblers. Although the bubblers protect the TPS glovebox from over pressurization from small leaks they do not protect the glovebox from the rapid pressure pulse associated with a potential glovebox deflagration. The revised hazard analysis will consider specific process operational failures and will derive controls accordingly. This includes a re-evaluation of the safety SSCs including associated sub-systems functional requirements and categorization. In the interim, the compensatory measure for tritium room monitors identified in the JCO

will provide for added worker protection by detecting and alerting facility workers to tritium releases from the glovebox.

Conduct of Operations

Staff Report Issue 7: LLNL does not use a comprehensive set of formal operating procedures to govern the TPS system operations. Rather, facility operations are accomplished through a combination of general-use procedures in conjunction with operator aids. The operator aids are used to develop the tritium-at-risk calculation and to guide the necessary system alignments. The staff noted that there were no formal review or approval mechanisms associated with the development of the required flow paths or system alignments and questioned whether the observed operating practices were of sufficient rigor to control operations. The RA team found that the use of an OSP with attached operating guidance does not meet the intent of procedures as defined by DOE O 5480.19.

Response 7: The process for developing and approving dynamic system alignments will be formalized and incorporated into a procedure that establishes the appropriate level of formal review and approval for actions taken for controlling tritium flowpaths and material-at-risk in the glovebox. A formal operating procedure is being developed to ensure the proper execution for inventory calculations including appropriate use of MathCAD® and ensuring the MathCAD® results are verified by hand calculation. The Corrective Action Plan from the NNSA RA addresses the issue concerning use of formal operating instructions/procedures and is scheduled for completion by July 31, 2010. Operating procedures currently attached to the OSP will be separated into stand-alone procedures. The OSP development procedure is being revised to ensure programmatic operating procedures are appropriately identified and utilized in accordance with Chapter 17 of DOE O 5480.19, *Conduct of Operations Requirements for DOE Facilities*.

LSO will provide additional facility representative oversight of B331 to oversee procedural compliance and implementation of controls. To provide this additional oversight, the primary B331 facility representative will be relieved of certain duties unrelated to B331. In addition, the senior facility representative assigned to the Plutonium Facility has recently completed qualification for B331 and will assist the primary B331 facility representative. LSO also has a facility representative in training for B331.

Staff Report Issue 8: The management-approved aids posted throughout the facility had inaccurate information related to the identification of various tritium alarms and the required personnel mustering locations in the event of an actual emergency. LLNL facility management indicated that these postings had been superseded, but had yet to be replaced by the current (presumably accurate) versions.

Response 8: The postings were corrected during the TPS RA.

Staff Report Issue 9: The public address system and the emergency alarms were difficult to hear inside the room housing TPS because of high background noise.

Response 9: The public address system in Room 157 was upgraded by installation of a new speaker.

Staff Report Issue 10: The ventilation exhaust duct in the room had been partially covered with duct tape in an attempt to achieve air flow balance.

Response 10: The building ventilation system was being upgraded and tape was being used to help achieve a rebalancing of the entire facility. The flow balance has been completed and the tape removed.

Staff Report Issue 11: The position indicators for the main (ventilation) isolation valves of the glovebox were difficult to read.

Response 11: The operators normally use the PLC for configuration indication; therefore the position indicators are secondary indicators. Although the indicators at the valve are difficult to read, they are adequate for the personnel trained on the system. However, facility management is investigating a better way to clarify the position indications.

CONCLUSION

The NNSA RA for TPS identified safety basis and conduct of operations concerns, which resulted in two post-start findings. LLNL identified conduct of operations issues during its RA for the commercial grinder. LSO and LLNL established a documented path forward for resolving the B331 safety basis and conduct of operations issues through resolution of RA findings for TPS and the commercial grinder and References 2, 3, 4, and 5 issued in December 2009 and January 2010. Broadly, the issues identified by LSO and LLNL align in principle with those in the DNSFB letter of late January 2010.

LLNL will provide a revised safety basis for B331 to LSO by June 30, 2010, for approval. Compensatory measures for tritium room monitors and the fire detection and alarm system described in the approved JCO will be implemented in the interim. These compensatory measures elevate existing controls to TSR-level controls and are in addition to the existing implemented TSR controls. These controls provide additional assurance to LSO regarding adequate protection of the facility worker until approval and implementation of the revised safety basis. LSO is organizing a review team with the required expertise to review the revised safety basis. Actions pertaining to conduct of operations and revising the procedures for TPS are scheduled for completion by July 31, 2010.

REFERENCES

(1) DNFSB Letter (J. Mansfield/T. D'Agostino) with Attached Staff Issue Report (J. Shackelford/T. Dwyer), *Review of the Tritium Process Station at Lawrence Livermore National Laboratory*, dated January 27, 2010

(2) COR-NSI-12/6/2009-218049 (A. Williams/B. Goodwin), *Scope of the Tritium Facility Documented Safety Analyses and Technical Safety Requirements Annual Update*, dated December 22, 2009

(3) COR-NSI-12/21/2009-221081 (A. Williams/B. Goodwin), *Validation of Closure of Tritium Facility Grinder Readiness Assessment Pre-Start Findings by the Livermore Site Office,* dated December 21, 2009

(4) NMTP10-004 (R. Rocha/A. Williams), *Building 331 Documented Safety Analysis Schedule for Resolution of Hazard Analysis Issue,* dated January 15, 2010

(5) COR-NSI-12/6/2009-218049 (A. Williams/B. Goodwin), *Approval of Scope for the Tritium Facility Documented Safety Analysis and Technical Safety Requirements Annual Update,* dated January 21, 2010