DEFENSE NUCLEAR FACILITIES SAFETY BOARD
Washington, DC 20004-2901

The Honorable Jennifer M. Granholm
Secretary of Energy
US Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Granholm:

The Defense Nuclear Facilities Safety Board's (Board) staff conducted a review of the nuclear criticality safety program implemented at the National Criticality Experiments Research Facility (NCERC), which is in the Device Assembly Facility at the Nevada National Security Site (NNSS). Personnel from Los Alamos National Laboratory (LANL) perform operations at NCERC, but the facility is managed by the NNSS contractor, Mission Support and Test Services, LLC (MSTS). As a result, elements from both approved criticality safety programs are implemented to form an integrated program[1] at NCERC.

Overall, the Board's staff team identified weaknesses in the NCERC criticality safety program that increase the potential for improper implementation of safety controls and decrease the likelihood that safety deficiencies would be detected by local safety oversight. The staff identified inconsistencies between the integrated criticality safety program used at NCERC and the applicable LANL corporate program; inadequate consideration of the impact of changes in the site-specific seismic hazard on NCERC's criticality safety evaluations; insufficient metrics for federal safety oversight to measure health of the integrated criticality safety program; and insufficient criticality safety analyst support for NCERC. These safety issues are discussed further in the enclosed report.

The Board concludes that an increased focus on safety oversight of the activities at NCERC, by both the responsible contractors and federal offices, would provide the National Nuclear Security Administration (NNSA) with an opportunity for addressing the safety issues identified during this review.

DOE recently submitted the annual criticality safety metrics report and provided a briefing on the report to the Board on May 13, 2022. However, the submitted report and briefing did not note the weaknesses from the attached report in the LANL program as implemented at

[1]The integrated criticality safety program at NNSS includes LANL, Lawrence Livermore National Laboratory (LLNL), and MSTS elements. However, since LLNL does not conduct operations at NCERC, the staff review team only assessed the LANL and MSTS elements related to NCERC.

NCERC. Therefore, pursuant to 42 United States Code § 2286b(d), the Board requests a report and briefing within 90 days that addresses the following safety questions:

- In light of the identified safety concerns and inconsistencies between the integrated criticality safety program used at NCERC and the applicable LANL corporate program, what is NNSA's evaluation of the criticality safety program implemented at NCERC?

- Considering the safety concerns identified in the attached report regarding federal safety oversight of NCERC operations, what is NNSA's evaluation of the effectiveness of federal safety oversight of the criticality safety program at NCERC?

- Based on these evaluations, what safety corrective actions, if any, are being taken by NNSA?

Sincerely,

Joyce L. Connery
Chair

Enclosure

c: The Honorable Jill Hruby
Dr. David R. Bowman
Mr. Theodore A. Wyka
Mr. Joe Olencz

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Report

December 14, 2021

Review of the Integrated Criticality Safety Program at the National Criticality Experiments Research Center, Nevada National Security Site

Summary. The Defense Nuclear Facilities Safety Board's (Board) staff conducted a review of the nuclear criticality safety program implemented at the National Criticality Experiments Research Center (NCERC). NCERC is in the Device Assembly Facility (DAF) at the Nevada National Security Site (NNSS). Personnel from Los Alamos National Laboratory (LANL) perform operations at NCERC, and Mission Support and Test Services, LLC (MSTS) manages and operates DAF. As a result, elements from both Department of Energy (DOE)-approved criticality safety programs are implemented to form an integrated program at NCERC. The National Nuclear Security Administration's (NNSA) Nevada Field Office (NFO) provides oversight of this integrated program.[1]

The staff review team identified:

- Inconsistencies between the integrated criticality safety program used at NCERC and the applicable LANL corporate program;
- Inadequate consideration of the impact of changes in the site-specific seismic hazard on NCERC's criticality safety evaluations;
- Insufficient metrics for federal safety oversight to measure health of the integrated criticality safety program; and
- Insufficient criticality safety analyst (CSA) support at NCERC.

The review team concludes that an increased focus on safety oversight of the activities at NCERC, by both the responsible contractors and federal offices, would provide an opportunity for addressing all the safety issues identified during this review.

Background. NCERC is located within DAF, a hazard category 2 defense nuclear facility at NNSS. NCERC supports a variety of nuclear security missions, including nuclear criticality safety research and training, nuclear emergency response, nuclear nonproliferation, and support for other government agencies. Operations at NCERC include (1) handling, storage, and packaging of significant quantities of fissionable material; (2) hand-assembly of standardized sub-critical configurations for training purposes; (3) preparation of non-standard sub-critical configurations for experimentation; and (4) operation of remotely operated critical

[1]The integrated criticality safety program at NNSS includes LANL, Lawrence Livermore National Laboratory (LLNL), and MSTS elements. However, since LLNL does not conduct operations at NCERC, the staff review team only assessed the LANL and MSTS elements related to NCERC.

assembly machines for experiments involving operations near or above a delayed critical configuration.

The NNSS management and operating contractor (MSTS), as well as personnel from LANL, perform work at NCERC. Multiple contractors performing work in one facility is a common occurrence at NNSS. Given this dynamic, NFO uses real estate operations permits (REOP) to ensure that work performed under its purview is clearly defined, properly authorized, and has distinct geographical boundaries [1]. At NNSS, a primary REOP holder is responsible to ensure that activities and operations conform to the safety basis for the permitted facility, or to develop and submit to NFO a revision to the safety basis that includes the scope of work identified in a secondary REOP. The secondary REOP holder authorizes programmatic work, assigns safety responsibility at the activity level, and, with the primary REOP holder, documents the roles, responsibilities, and relationships between the primary and secondary REOP holders. At NCERC, MSTS is the primary REOP holder and LANL is a secondary REOP holder.

The NFO directive on REOPs states, "Standardized, site-wide safety management programs (SMP) developed jointly by the Nevada National Security Site (NNSS) Management and Operations (M&O) Prime Contractor and secondary REOP holder(s) are preferred in the Nevada Facility User Model; however, primary REOP holders are required to accept secondary REOP holders' SMPs developed under a DOE-approved Integrated Safety Management System or equivalent." At NCERC, both MSTS and LANL implement portions of their DOE-approved nuclear criticality safety program to form one integrated program. The interface points of this integrated program are defined in PD-NOPS.003, *Integrated Nuclear Criticality Safety Program Description* [2].

As the primary REOP holder, PD-NOPS.003 states that responsibilities for MSTS include developing and submitting safety basis documents to maintain facility safety, ensuring that safety basis changes that impact operations will be coordinated with the secondary REOP holder, incorporating criticality safety controls into the safety basis, and providing configuration management of the real property in a facility. As a secondary REOP holder, LANL is responsible for performing the criticality safety evaluations associated with LANL NCERC activities, informing MSTS of new criticality safety controls, providing configuration management of LANL programmatic equipment, and notifying MSTS of any conduct of operations issues or conditions adverse to criticality safety.

The objectives of the team's review of the integrated nuclear criticality safety program implemented at NCERC were to:

- Assess the compliance of the integrated program with DOE directives and industry standards,
- Evaluate the assumptions used and controls identified in criticality safety evaluation documents (CSED) for select NCERC operations, and
- Assess DOE oversight of the integrated program.

The staff initiated this review in the summer of 2019 with a walkthrough of the facility. Changes to the review team composition and the onset of the COVID-19 pandemic delayed completion of the review. The review team transmitted an agenda with lines of inquiry for LANL, MSTS, and NFO on February 7, 2020. The contractors and NFO provided written responses to the agenda, and the review team held a remote meeting with the contractors and the Los Alamos and Nevada NNSA field offices on September 23, 2020, followed by a factual accuracy discussion on July 7, 2021. In addition, two members of the review team attended the December 2020 virtual meeting of the NNSS integrated nuclear criticality safety program (NCSP) committee.

Discussion. The review team identified several safety concerns during its review of the integrated NCSP implemented at NCERC, which are discussed below.

Inconsistent Implementation of LANL Criticality Safety Program Improvements—In 2013, LANL paused operations at the Technical Area 55 Plutonium Facility (PF-4) due to non-compliance issues with its NCSP. Since then, the Board has maintained focused safety oversight of the LANL criticality safety program through several staff reviews, resident inspector engagement, and the annual DOE criticality safety metrics report. As noted in the Board's November 28, 2018, letter [3], LANL has made several improvements to its criticality safety program. However, the review team found that some of those improvements have not been incorporated at NCERC. The review team is concerned that inconsistent implementation of the LANL NCSP improvements at NCERC could result in implementation deficiencies during fissile material operations at NCERC. The review team identified the following inconsistencies in the implementation of program improvements:

Procedure Development for Fissionable Material Operations. In July 2014, LANL revised its conduct of operations manual [4]. As part of this revision, LANL provided a minor update to Attachment 16 that clarified "the expectations regarding the highlighting of key procedure steps and/or information, including the methods to be used for safety basis and criticality safety steps and/or information." Appendix 16-B of the manual states, "Procedures reflect human factors' considerations such as procedure callouts exactly matching equipment labels, units in procedures match instrument markings, charts and graphs are easily read, and important steps or information are highlighted. Refer to FSD-315-16-001, Section 6.0, *Key Information/Steps*, for highlighting techniques." Section 6.2 of FSD-315-16-001, *Technical Procedure Writer's Manual* [5], provides guidance that states, "Information (e.g., description of the CSED or CSLA [criticality safety limit approval] control) and action steps related to NCS [nuclear criticality safety] limits must be highlighted by the addition of an asterisk (*)…or a circle CS…to the first line of the text in the left margin. As an alternate, the asterisk (*) or a bolded, upper case CS, may precede the action step or information text, separated by a dash."

The review team found that the procedure used at NCERC for developing technical procedures [6] does not provide this guidance, and that the operating procedures used by LANL personnel at NCERC do not highlight information and action steps related to nuclear criticality safety limits. LANL personnel at NCERC stated that the entire procedure is important to criticality safety and highlighting any step would detract from that. The review team concludes

that highlighting these steps would better ensure that criticality safety requirements are implemented during fissile material operations.

The review team also found that some NCERC procedures for constructing inspection objects or radiation test objects do not include steps to implement administrative requirements identified in the CSLA. The review team identified the following examples:

- The CSLAs for constructing inspection and radiation test objects identify the fissile material allowed in the building and reflectors and/or moderators that may be used (depending on the configuration). However, the procedures do not list the material that is allowed in the building (the procedures state that the user should refer to the applicable CSLA). Also, the procedures do not include different steps for assembling the different configurations that are allowed.

- The CSLA for assembling inspection object 3 identifies several criticality safety requirements. However, the procedure for this activity [7] only includes one step for assembling the object, which states, "ASSEMBLE the IO [Inspection Object], as directed by the FM PIC [fissionable material person-in-charge], while obeying the controls and process description in the applicable CSLA." There are no steps to ensure that LANL personnel are using the appropriate hemi-shells or to verify the weight of the object.

- The CSLA for assembling radiation test object 19 identifies several criticality safety requirements, which include confirming the total thickness of reflector materials prior to moving them into the work location, actions to take during an abnormal event, and not leaving certain assemblies unattended. However, the procedure for this activity [8] does not include steps to implement these requirements.

LANL personnel stated that fissile material operations at NCERC differ from the operations conducted at PF-4 and require flexibility. In addition, they highlighted that each procedure has the applicable CSLA attached, which is allowed by LANL's NCSP, so that it can be referred to during the activity. However, the review team found this approach to be inconsistent with American National Standards Institute (ANSI)/American Nuclear Society (ANS) 8.1-2014, *Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors* [9]. Specifically, section 4.1.3 of ANSI/ANS 8.1-2014 states, "The procedures shall specify all parameters that they are intended to control."

Lastly, there have been several events reported in the Occurrence Reporting and Processing System that occurred at NCERC during the past two and a half years (see list of events in Appendix A). The review team found that the failure to adequately implement or comply with established requirements was the common theme of these events. Therefore, the review team concludes that the procedures should include more straightforward and explicit steps for conducting the operation and implementing administrative requirements identified in the CSLA. Highlighting information and action steps related to nuclear criticality safety limits in the procedures would help ensure that these actions are implemented during operations. LANL

personnel at NCERC indicated that they are trying to be more explicit in steps in future procedure development.

Annual Fissionable Material Operation Review (FMOR): As part of its effort to improve the LANL NCSP, the LANL nuclear criticality safety division (NCSD) developed a procedure in 2013 that included roles, responsibilities, requirements, and processes for conducting a FMOR. The FMOR is required by ANSI/ANS 8.19-2014, *Administrative Practices for Nuclear Criticality Safety* [10], which states, "Operations shall be reviewed at least annually to verify that procedures are being followed and that process conditions have not been altered so as to affect the nuclear criticality safety evaluation." The initial procedure has since been revised to NCS-AP-009, *Fissionable Material Operational Reviews* [11]. At NCERC, LANL deviates from this procedure and follows the guidance in CEF-PLA-014, *Administrative Practices for Nuclear Criticality Safety for NEN Operations at the NNSS* [12]. In general, the review team found that NCS-AP-009 provides more guidance for performing the annual review than CEF-PLA-014.

For example, the review team found that the form used to document the annual review differed between NCS-AP-009 and CEF-PLA-014. LANL personnel at NCERC stated that the form in NCS-AP-009 was initially used for NCERC operations. However, they found the form to not be representative of NCERC operations and, as a result, developed the forms in CEF-PLA-014. The review team identified the following concerns:

- The form in NCS-AP-009 includes questions on whether previous corrective actions and recommendations from previous operational reviews have been addressed. In addition, this form includes a section to list any issues, recommendations, or noteworthy practices identified during the review. The review team found that the forms in CEF-PLA-014 do not include similar questions or a dedicated section for listing issues, recommendations, or noteworthy practices identified during the review. LANL personnel at NCERC stated that the blank additional page was typically used to capture any issues, recommendations, or noteworthy practices.

- The CEF-PLA-014 forms include a question that states, "Did you review the activity environment, equipment, support systems, process description, and criticality safety requirements to ensure that procedures are being followed and changes have not occurred to the activity that could challenge the criticality safety basis?" The form in NCS-AP-009 has similar questions, however, they are not all grouped together. This allows the user to comment on each question individually and ensure no item is overlooked.

The review team also found differences between NCS-AP-009 and CEF-PLA-014 in how to conduct the annual review. NCS-AP-009 states, "The review should be conducted in two parts: an administrative review followed by a field review," and includes a section on the requirements for the field review. NCS-AP-009 also states, "It is very important to physically inspect and assess the actual operation as well as its location." CEF-PLA-014 states, "It is preferred that operational reviews are conducted in the facility while fissionable material operations are occurring but a table top review may be performed if this is not possible." The review team is

concerned that without observing the activity, LANL personnel at NCERC cannot adequately verify that procedures are being followed and criticality controls are being properly implemented.

None of the 18 completed review forms received from 2019 and 2020 for activities at NCERC included field observation of the activity. LANL personnel at NCERC stated that they would prefer to conduct the annual review concurrently with the operation, but the various test object builds only occur when there is a customer need (i.e., LANL personnel do not continually perform the activities at NCERC). Consequently, LANL personnel indicated that conducting tabletop reviews is an appropriate way to review NCERC operations on an annual basis. As a result, they schedule all the annual reviews for NCERC operations to occur during a specific week in October. LANL personnel indicated that they would attempt to observe the NCERC operation if it is occurring the same week of the review.

Inadequate Consideration of Impacts of Increased Seismic Hazard—The review team also found that LANL personnel at NCERC failed to consider the impact of an increased seismic hazard on its criticality safety evaluations. In a letter dated March 25, 2019 [13], NFO accepted MSTS's recommendation to not update the 2007 probabilistic seismic hazard analysis (PSHA) for DAF on the condition that a 7 percent increase be incorporated for the peak ground acceleration. This letter was sent to all REOP holders at DAF, including LANL personnel.

Out of a sampling of 21 NCERC CSEDs reviewed, the staff review team identified one that analyzed the potential for a package to tip over during a seismic event. NCERC personnel did not reanalyze this CSED to consider the increase in the peak ground acceleration. While this analysis used the peak ground acceleration from the 2007 PSHA, it showed that the analyzed package would not tip over due to a 10 percent increase in ground acceleration. Therefore, the 7 percent increase is covered but the safety margin has been reduced.

In addition, LANL personnel at NCERC completed a qualitative analysis in 2020 that evaluated each CSED for active NCERC operations to determine whether the water from the fire suppression system was discussed, or whether another upset bound the activation of the fire suppression system (e.g., flooding in the building) [14]. From the analysis, LANL personnel found that each CSED met at least one of these criteria. LANL personnel also evaluated the impact of a seismic event on the fire suppression system. LANL personnel found that the DAF and NCERC safety basis states that the fire suppression system (including its piping) will be able to meet the functional requirements, which includes remaining operational during and after the design basis earthquake. Therefore, LANL personnel concluded that an inadvertent activation of the fire suppression system during a seismic event is not credible and does not need to be evaluated in future CSEDs.

However, the review team found that the DAF safety basis [15] includes the following vulnerability for the fire suppression system: "[T]he PSHA was updated resulting in greater ground motions than those considered in the previous seismic evaluation. Evaluation of the capability of the FSS [fire suppression system] to meet applicable seismic criteria with the new seismic hazard was suspended before it was completed." This vulnerability is tied to the seismic hazard increase that was identified after the completion of the 2007 PSHA update. Given that the fire suppression system has not been evaluated to the seismic hazard increase associated with the

2007 PSHA update (and the 7 percent increase in the peak ground acceleration), the review team concludes that it is inappropriate to consider an inadvertent activation of the fire suppression system during a seismic event to not be credible. Therefore, the CSEDs for active NCERC operations should be reevaluated to consider this credible event.

LANL personnel at NCERC indicated that the increased value would likely not be addressed in the CSEDs until the increase has been incorporated into the safety basis for the facility at some future date. The review team concludes that the increased seismic hazard could have been addressed in the CSEDs if the site declared a potential inadequacy of the safety analysis and implemented the unreviewed safety question (USQ) process once it identified the increased seismic hazard. A similar issue was recently communicated by the Board in Technical Report 47, *Seismic Hazard Assessments* [16]. The Board found that sites were not implementing the USQ process to assess the impacts of an increased seismic hazard on safety controls. Because the increased seismic hazard has not been properly assessed at NCERC, the review team is concerned that NCERC activities continue to operate with an unanalyzed criticality safety risk and without additional controls being considered.

Insufficient Metrics for NFO to Measure Health of Integrated Program—The memorandum of agreement (MOA) between NFO and the NNSA Los Alamos Field Office (NA-LA) describes the responsibilities for each field office for work activities performed by LANL, under contract to NA-LA, at facilities or geographic locations under the jurisdiction and management of NFO [17]. Per the MOA, NFO is responsible for "performing oversight of LANL activities and operations." NFO performs oversight of the integrated criticality safety program implemented at NCERC by performing operational awareness activities and formal assessments, as described in DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy* [18]. NFO also attends meetings where MSTS and LANL are determining whether criticality safety controls for a new NCERC activity need to be incorporated into the DAF safety basis.

In addition, PD-NOPS.003 states, "The M&O [Management and Operating] Contractor, LANL, and LLNL will continue to maintain and report the metrics that are currently required in their respective NCSPs. A summary of these metrics will be gathered by the M&O Contractor and periodically provided to NNSA/NFO Criticality Safety Oversight to establish a performance baseline and to measure how and how well the integration of the three NCSPs is working." The review team evaluated the LANL metric reports that are provided to NFO. The team found that the metric reports provide information on the general organizational health of LANL's nuclear criticality safety program, which is dominated by PF-4 activities, and do not contain specifics for the integrated program implemented at NCERC.

NNSA's Chief of Defense Nuclear Safety identified this concern during its biennial review of NFO in 2018. That team identified an opportunity for improvement for NFO to develop criticality safety metrics specific to NNSS [19]. However, the review team found that NFO had closed the corrective action for the 2018 biennial review after the laboratories and MSTS stated that the current reports contain all pertinent information [20]. The review team is concerned that the LANL metric reports do not provide sufficient information to assist NFO in establishing a performance baseline and understanding how well the integration of the programs is working at NNSS.

Insufficient Criticality Safety Analyst Support at NCERC. The review team found that LANL has not assigned an adequate number of qualified CSAs to provide full-time support to NNSS. LANL NCSD currently has three individuals assigned to NNSS. These three individuals provide CSA support to the LANL staff that performs work at NCERC (i.e., the Nuclear Engineering and Nonproliferation [NEN] Division) and the LANL staff that performs subcritical experiments (SCE). Of the three individuals, one is an analyst in training, one is a qualified analyst, and the last is a senior qualified analyst. Two of these individuals are subcontractors.

The lack of sufficient CSA support for NCERC was identified by a team, independent of the NEN Division, during a 2018 assessment of implementation of the LANL nuclear criticality safety program at NNSS [21]. While the independent assessment team concluded that the NEN Division has done "an excellent job of implementing the LANL Nuclear Criticality Safety Program," their report also stated:

> [T]*he assessment team wants to emphasize that available CSA support to NEN and SCE at the NNSS has been, and remains, barely adequate.…The team identified no findings but many Opportunities for Improvement (OFIs), most of which can be traced to the absence of robust, continuous CSA level of support over the years.*

The independent assessment team identified an opportunity for improvement that states, "NCSD Management should increase CSA staff dedicated to NNSS operations to at least 3 FTEs [full-time equivalents]." While there are three individuals in the LANL NCSD assigned to NNSS, the review team found that these analysts only spend part of their time supporting NNSS.

In response to the independent assessment, the LANL NCSD and NEN Division revised the memorandum of understanding (MOU) between the two organizations [22]. The revised MOU states, "As part of a strategy to help meet Nuclear Engineering and Nonproliferation (NEN) Division needs in criticality safety, qualified CSAs in NEN Division are authorized to provide criticality safety support." While the MOU specifies some roles and responsibilities for NEN and NCSD CSAs, it does not appear that the MOU accounts for all necessary assignments.

For example, section 7.4 of ANSI/ANS 8.19-2014 states, "Before the start of operation, there shall be an independent review that confirms the adequacy of the nuclear criticality safety evaluation." The MOU does not assign responsibilities for conducting this independent review. The review team concludes that the roles and responsibilities of the NEN and NCSD CSAs should be clearly defined to ensure that independence is maintained where necessary.

Conclusion. The review team identified inconsistencies in the implementation of LANL NCSP improvements between the integrated criticality safety program used at NCERC and the LANL corporate program to which it is responsible. LANL made these improvements to its corporate program after the operations pause at PF-4 in 2013. The inconsistencies with the integrated program at NNSS are related to how LANL personnel at NCERC develop procedures for fissionable material operations and how they conduct the annual FMOR. The review team recognizes that fissile material operations at NCERC are different than those at PF-4. However, inconsistent implementation of the LANL NCSP improvements at NCERC could result in

deficiencies in implementation of safety controls for fissile material operations at NCERC. Also, it does not appear that LANL and NCERC staff have adequately reviewed and resolved the differences between LANL and NCERC operations to ensure that differences in program implementation are appropriate and that the NCERC nuclear criticality safety program adequately complies with applicable standards and DOE expectations.

The review team also found that LANL personnel at NCERC had not adequately considered the impact of an increased seismic hazard on its criticality safety evaluations, reports on criticality safety metrics for NCERC provide insufficient information to contractor and federal oversight of the facility and program, and NCERC does not have sufficient CSA support.

The review team concludes that an increased focus on the safety oversight of the activities at NCERC, by both the responsible contractors and federal offices, would provide an opportunity for addressing all the safety issues identified in this review.

Appendix A: List of Occurrence Reporting and Processing System Events

The following events, reported in the Occurrence Reporting and Processing System, occurred at the National Criticality Experiments Research Center (NCERC) within the past two and a half years:

- July 24, 2019: Los Alamos National Laboratory (LANL) personnel at NCERC found the door to a storage location containing fissionable material to not be properly closed and latched; this was determined to be a criticality safety infraction.

- July 30, 2019: Operators did not enter the correct building mode (i.e., warm standby to hot operations) prior to moving containers with fissionable material into an NCERC building; this was determined to be a technical safety requirements (TSR) violation.

- July 20, 2020: LANL personnel at NCERC identified a sealed source that exceeded the minimum mass threshold for exclusion from criticality safety considerations in the building when operators were unpackaging fissile material; this was determined to be a criticality safety infraction.

- April 22, 2021: LANL personnel at NCERC found radioactive material staged in an area that is not allowed in the safety basis; this was determined to be a potential inadequacy of the safety analysis and led to a positive unreviewed safety question determination.

- May 20, 2021: Operators again did not enter the correct building mode prior to moving containers with fissionable material into an NCERC building; this was determined to be a TSR violation.

References

[1] National Nuclear Security Administration Nevada Field Office, *Real Estate Operations Permit*, NFO O 412.X1, Revision 0, June 2016.

[2] Mission Support and Test Services, LLC, *Integrated Nuclear Criticality Safety Program Description*, PD-NOPS.003, Revision 1, November 2018.

[3] Defense Nuclear Facilities Safety Board, *Los Alamos National Laboratory Nuclear Criticality Safety Program*, November 2018.

[4] Los Alamos National Laboratory, *Conduct of Operations Manual*, P315, Revision 9, July 2018.

[5] Los Alamos National Laboratory, *Technical Procedure Writer's Manual*, FSD-315-16-001, Revision 1, February 2016.

[6] Joint Laboratory Office – Nevada, *NCERC Document Processing and Use*, CEF-ADM-004, Revision 5, October 2020.

[7] Joint Laboratory Office – Nevada, *NCERC Inspection Object (IO) Construction Procedure for IO-003*, CEF-SOP-IO-003, Revision 0, November 2018.

[8] Joint Laboratory Office – Nevada, *NCERC Radiation Test Object (RTO) Construction Procedure for RTO-019*, CEF-SOP-RTO-019, Revision 2, January 2015.

[9] American National Standards Institute/American Nuclear Society, *Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors*, ANSI/ANS 8.1-2014, April 2014.

[10] American National Standards Institute/American Nuclear Society, *Administrative Practices for Nuclear Criticality Safety*, ANS/ANSI 8.19-2014, July 2014.

[11] Los Alamos National Laboratory, *Fissionable Material Operational Reviews*, NCS-AP-009, Revision 1, July 2018.

[12] Joint Laboratory Office – Nevada, *Administrative Practices for Nuclear Criticality Safety for NEN Operations at the NNSS*, CEF-PLA-014, Revision 3, January 2016.

[13] National Nuclear Security Administration Nevada Field Office letter to Mission Support and Test Services, LLC, *Contract DE-NA0003624, Recommendation for the Continued Use of the 2007 Device Assembly Facility (DAF) Probabilistic Seismic Hazard Analysis (PSHA) Revised*, March 2019.

[14] Los Alamos National Laboratory, *Criticality Safety Review of the Fire Suppression System and Seismic Events in the Device Assembly Facility at the Nevada National Security Site*, NCS-TECH-19-014, Revision 0, May 2020.

[15] National Security Technologies, LLC, *Nevada National Security Site Device Assembly Facility Documented Safety Analysis,* DAF-DSA-01, Revision 4, September 2015.

[16] Defense Nuclear Facilities Safety Board, *Seismic Hazard Assessments*, Technical Report 47, June 2021.

[17] *Memorandum of Agreement DE-GM58-14NA25512 Between the National Nuclear Security Administration Nevada Field Office and Los Alamos Field Office*, March 2014.

[18] Department of Energy, *Implementation of Department of Energy Oversight Policy,* DOE Order 226.1B, April 2011.

[19] National Nuclear Security Administration, *Headquarters Biennial Review of Field Nuclear Safety Performance Report for the Nevada Field Office*, September 2018.

[20] Nevada Field Office, *Criticality Safety Metrics*, OAA-20-AMOS-TJC-2/11/2020, February 2020.

[21] Los Alamos National Laboratory, *Final Report of the Independent Assessment of the LANL Nuclear Criticality Safety Program at the Nevada National Security Site*, NCS-RPT-18-2, October 2018.

[22] Los Alamos National Laboratory, *Memorandum of Understanding between the Nuclear Criticality Safety Division and the Nuclear Engineering & Nonproliferation Division*, NCS-MEMO-19-008, April 2019.

AFFIRMATION OF BOARD VOTING RECORD

SUBJECT: National Criticality Experiments Research Facility Criticality Safety Program

Doc Control#: 2022-100-0021

The Board acted on the above document on 06/08/2022. The document was Approved.

The votes were recorded as:

	APRVD	DISAPRVD	ABSTAIN	NOT PARTICIPATING	COMMENT	DATE
Joyce L. Connery	✔	☐	☐	☐	☐	06/08/2022
Thomas Summers	✔	☐	☐	☐	☐	06/08/2022
Jessie H. Roberson	✔	☐	☐	☐	☐	06/08/2022

This Record contains a summary of voting on this matter together with the individual vote sheets, views and comments of the Board Members.

Shelby Qualls

Executive Secretary to the Board

Attachments:

1. Voting Summary
2. Board Member Vote Sheets

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

NOTATIONAL VOTE RESPONSE SHEET

FROM: Joyce L. Connery

SUBJECT: National Criticality Experiments Research Facility Criticality Safety Program

Doc Control#: 2022-100-0021

DATE: 06/08/2022

VOTE: Approved

COMMENTS:

None

Joyce L. Connery

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

NOTATIONAL VOTE RESPONSE SHEET

FROM: Thomas Summers

SUBJECT: National Criticality Experiments Research Facility Criticality Safety Program

Doc Control#: 2022-100-0021

DATE: 06/08/2022

VOTE: Approved

COMMENTS:

None

Thomas Summers

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

NOTATIONAL VOTE RESPONSE SHEET

FROM: Jessie H. Roberson

SUBJECT: National Criticality Experiments Research Facility Criticality Safety Program

Doc Control#: 2022-100-0021

DATE: 06/08/2022

VOTE: Approved

Member voted by email.

COMMENTS:

None

Jessie H. Roberson