Department of Energy
National Nuclear Security Administration
Washington, DC 20585

OCT 0 9 2012

The Honorable Peter S. Winokur
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004

Dear Mr. Chairman:

This is in response to your June 11, 2012, letter that requested information regarding the Transuranic Waste Facility (TWF) Project preliminary design at Los Alamos National Laboratory (LANL). Specifically, your letter requested a report identifying actions taken or planned by the National Nuclear Security Administration (NNSA) to resolve five specific concerns, which are discussed in detail in the enclosure.

The Department of Energy (DOE) safety basis review process also identified similar issues in 2010 and 2011. Los Alamos National Security, LLC (LANS) has revised, and NNSA has accepted, an aircraft crash analysis that complies with the DOE aircraft crash analysis standard. The analysis concludes the release frequency is below 1×10^{-6} per year, which eliminates the need to identify an aircraft crash as a design basis accident.

NNSA expects all previous safety basis comments to be successfully dispositioned when the Preliminary Documented Safety Analysis (PDSA) is submitted for review within the next few weeks. By January, 31, 2013, NNSA intends to technically review the PDSA and issue a Safety Evaluation Report (SER) if the PDSA is acceptable.

The enclosure to this letter provides a detailed response to the Board's concerns. If you have any questions concerning this matter, please contact me or Mr. Michael Thompson, Assistant Deputy Administrator for Infrastructure and Construction, at (202) 586-5091.

Sincerely,

DONALD L. COOK
Deputy Administrator
for Defense Programs

Enclosure

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Enclosure: Detailed Response to DNFSB letter of June 11, 2012

In a letter dated June 11, 2012, to the National Nuclear Security Administration (NNSA), the Defense Nuclear Facility Safety Board (DNFSB) identified five concerns with the Transuranic Waste Facility (TWF) Project at Los Alamos National Laboratory (LANL).

The Department of Energy (DOE) safety basis review process also identified similar issues: first, in the Conceptual Safety Validation Report in July 2010, and again in the Preliminary Safety Validation Report in October 2011. As part of this process, the National Nuclear Security Administration (NNSA) determined progress was not being achieved in the areas of deposition velocity and in the large vehicle crash analysis and provided direction to LANS to meet the HSS-bulletin recommendation on deposition velocity (August 2012) and to pursue an engineered control for the vehicle crash analysis (September 2012); we expect these actions will resolve the relevant DNFSB concerns. Los Alamos National Security, LLC (LANS) has also revised and NNSA is poised to accept a revised aircraft crash analysis that complies with the DOE aircraft crash accident analysis standard (DOE-STD-3014-2006); the analysis concludes the release frequency is below 1 $x10^{-6}$ per year, which eliminates the need to identify an aircraft crash as a design basis accident.

NNSA expects all previous safety basis comments to be successfully dispositioned when the Preliminary Documented Safety Analysis (PDSA) is submitted for review within the next few weeks. By January 31, 2013, NNSA intends to technically review the PDSA and issue a Safety Evaluation Report (SER) if the PDSA is acceptable.

The DNFSB requested a report identifying actions taken or planned by NNSA to resolve these safety issues. Each of the issues and a summary of actions taken or planned are provided below.

1. *Issue - Modeling Sealed Sources:* Key parameters in the accident analysis for events involving sealed sources may not be conservative or compliant with the bounding values recommended in Department of Energy (DOE) Handbook 3010, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities.* Specifically, the project's safety analysts adopted airborne release and respirable fractions from DOE Standard 5506, *Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities*, which are not appropriate for modeling of accidents involving sealed sources. The postulated radiological consequences from insults to the sealed sources are therefore underestimated.

   Actions Taken or Planned: NNSA identified an excessive sealed source inventory issue in the October 2011 Preliminary Safety Validation Report. The project's assumed sealed source inventory has since been reduced about a factor of five, from 10 kCi to 2.2 kCi. The reduction in the sealed source inventory is driven by program needs that were overestimated in earlier safety basis documents. The assumed airborne release and respirable factions (ARF*RF) have also been revised to be consistent with the DOE Handbook 3010 (Sections 4.4.3.3.2) for impact on materials in containers (ARF*RF =

$1x10^{-4}$). The three affected accident scenarios currently have calculated doses to the maximally exposed off-site individual (MEOI) below 5 rem.

Within the next few weeks, LANS intends to submit a PDSA that includes the revised calculation. By January 31, 2013, NNSA intends to technically review the PDSA and issue a Safety Evaluation Report (SER) if the PDSA is acceptable.

2. *Issue - Assumed Deposition Velocity:* The project team is not fully adhering to the May 2011 safety bulletin from DOE's Office of Health, Safety, and Security (DOE-HSS) regarding deposition velocity and therefore lacks an adequate basis to support the value of 1 centimeter/second used in the accident calculations. As a result, the calculated dose consequences to the public from postulated accidents at the TWF are non-conservative.

   Actions Taken or Planned: NNSA identified the deposition velocity issue in the October 2011 Preliminary Safety Validation Report. In August 2012, the NNSA Los Alamos Site Office directed LANS as follows:
   - Proceed with the TWF safety basis development assuming a deposition velocity of 0.4 cm/sec;
   - Confirm the adequacy of the assumed deposition velocity and appropriately revise other key input parameters to ensure they are reasonably conservative; and
   - Include technical justification in the next scheduled safety basis deliverable (i.e., the upcoming PDSA submittal).

   This action was based on the DOE Standard 3009 methodology setting an expectation that calculations be based on reasonably conservative inputs of the various input parameters (Section A.3). For the TWF Project, LANS submitted an analysis based on DOE-HSS recommended methodology (i.e., the GENII2 code) that establishes that 0.4 cm/sec is a reasonably conservative input parameter for the TWF location. This conclusion is based on a white paper that summarized a Pacific Northwest National Laboratory deposition velocity calculation that encompassed the entire LANL site. This analysis conservatively showed a deposition velocity range of 0.2 cm/s to 0.6 cm/s represents the various terrains encountered at the LANL site. When applied directly to the terrain at the TWF location, the white paper supports using a 0.4 cm/s deposition velocity.

   Within the next few weeks, LANS will submit a PDSA that includes technical justification for critical input parameters for deposition velocity and atmospheric dispersion modeling. By January 31, 2013, NNSA intends to technically review the PDSA, including critical input parameters, and issue a Safety Evaluation Report (SER) if the PDSA is acceptable.

3. *Issue - Aircraft Crash into Multiple Structures:* The project team's conclusion that an event involving an aircraft crash impacting a waste storage building is incredible may not be defensible since the analysis on which it is based did not follow the process established by DOE Standard 3014-2006, *Accident Analysis for Aircraft Crash into Hazardous Facilities.* The standard defines a facility to include "the collection of such structures that could be

affected by a single aircraft impact." The analysis did not account for the potential of a single aircraft to impact multiple storage buildings. As a result, the probability of an aircraft impacting the TWF could be higher than the screening threshold for external man-made accidents identified in DOE Standard 3009, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses.*

Actions Taken or Planned: In July 2010, NNSA issued a Conceptual Safety Validation Report for TWF that raised a concern that the aircraft crash analysis did not follow DOE Standard 3009 because it did not specifically follow DOE Standard 3014-2006 methodology. The issue was raised again in the October 2011 Preliminary Safety Validation Report (Comment #117) and in the May 2012 NNSA response to a revised aircraft crash analysis. NNSA directed LANS to analyze the entire TWF site that included all six buildings that would contain material-at-risk and to use conditional probabilities and identify the potential effective areas of multi-building scenarios. In a September 2012 calculation, LANS was able to use the DOE Standard 3014 methodology to show that up to three of the six buildings could be impacted by a single aircraft crash and identified the conditional probabilities and the worst-case flight approach angle and direction. The analysis determined the total effective impact area in the manner prescribed in the release frequency section of the standard. The combined effective area of multiple building impacts resulted in a lower frequency accident than that for the largest single-storage building, which bounds the event. The analysis complies with DOE-STD-3014-2006 methodology and concludes that the release frequency is below 1×10^{-6} per year, which eliminates the need to identify an aircraft crash as a design basis accident.

The aircraft crash analysis will be part of the PDSA that LANS submits in the next few weeks. NNSA will make a determination upon issuing the SER, by January 31, 2013.

4. *Issue - Large Vehicle Crashes:* The calculation used by the project team to screen large truck crashes from consideration in the design of the safety-class vehicle barriers is based on a number of non-conservative and inadequately supported assumptions. As a result, the vehicle barriers may be undersized.

   Actions Taken or Planned: In September 2012, NNSA directed LANS to proceed with the development of an engineered safety control that will prevent a large vehicle (10,000 lbs or greater) from impacting TWF structures. The control selection is required to follow the DOE Standard 3009 hierarchy: preventive over mitigative and engineered over administrative. NNSA also directed LANS to consider collecting additional data to support a frequency analysis for large vehicle crash rates that includes sufficient measurement of traffic patterns to reach a statistically valid conclusion. NNSA required that any such frequency analysis will need to demonstrate a crash frequency less than 10^{-7} per year if it uses realistic methodology consistent with DOE Standard 3009.

   During the next few months, NNSA will work with LANS to explore engineered solutions to the large vehicle crash scenario and fold the results into the PDSA development process. A number of potential physical features or barriers could satisfy

the requirements; Los Alamos Site Office fully expects the chosen solution to be acceptable.

5. *Issue - Fire Protection:* The approach to protecting the safety-significant fire protection system from potential freeze damage relies in part on non-safety-related components to perform a credited alarm and notification function. This approach is not consistent with DOE's guidance for freeze protection in the *Interim Guidance for Design and Operation of Wet Pile Sprinkler Systems and Supporting Water Supplies.*

   Actions Taken or Planned: NNSA identified the fire suppression freeze protection issue in the October 2011 Preliminary Safety Validation Report. The DOE Standard 3009 hierarchy for controls is: preventive over mitigative, engineered over administrative and passive over active. Upon further review, the site has determined that it is better to prevent a large fire in TWF than to credit mitigation, for safety basis purposes, that is based on an increasing complex set of active engineered controls with associated maintenance and reliability liabilities.

   TWF will have fire suppression, at least, for code compliance and as defense-in-depth for nuclear safety. When developing the fire hazard analysis, LANS should be able to show that the large fire is adequately prevented by building-wall fire barriers, combustible inventory control, hot-work and ignition source control, and other related controls that have been shown to be effective and reliable in the past in other nuclear facilities. This is not a technically challenging issue but requires LANS due diligence in the development and justification of controls in the PDSA.

   Within the next few weeks, LANS will submit a PDSA that includes technical justification for proposed safety controls, including for fire protection. If the technical case leads the NNSA safety basis review team to determine that fire suppression should be credited in the safety basis, then NNSA's expectation is that any support systems (e.g. freeze protection) will be raised to the same level as the primary system (i.e., safety class or safety significant). By January 31, 2013, NNSA intends to technically review the PDSA, including control selection, and issue a Safety Evaluation Report (SER) if the PDSA is acceptable.