

**AFFIRMATION OF BOARD VOTING RECORD**

**SUBJECT: Recommendation 10-1 Closure Letter**

**Doc Control#2016-200-006**


The Board, with Board Member(s) Joyce L. Connery, Sean Sullivan, Bruce Hamilton *approving*, Board Member(s) Jessie H. Roberson, Daniel J. Santos *disapproving*, Board Member(s) none *abstaining*, and Board Member(s) none *recusing*, have voted to approve the above document on September 21, 2016.

The votes were recorded as:

	APRVD	DISAPRVD	ABSTAIN	NOT PARTICIPATING*	COMMENT	DATE
Joyce L. Connery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	09/19/16
Jessie H. Roberson	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	09/20/16
Sean Sullivan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	09/21/16
Daniel J. Santos	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	09/19/16
Bruce Hamilton	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	09/19/16

\*Reason for Not Participating:

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

  
Executive Secretary to the Board

Attachments:

1. Voting Summary
2. Board Member Vote Sheets

cc: Board Members  
OGC  
OGM Records Officer  
OTD

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**  
**NOTATIONAL VOTE RESPONSE SHEET**

**FROM:** Joyce L. Connery

**SUBJECT:** Recommendation 2010-1 Closure Letter

**Doc Control#2016-200-006**

**Approved**  \_\_\_\_\_

**Disapproved** \_\_\_\_\_

**Abstain** \_\_\_\_\_

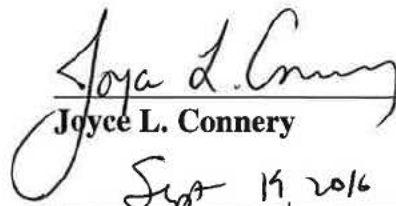
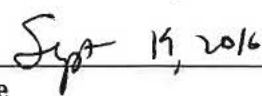
**Recusal - Not Participating** \_\_\_\_\_

**COMMENTS:**

**Below** \_\_\_\_\_

**Attached** \_\_\_\_\_

**None**  \_\_\_\_\_

  
\_\_\_\_\_  
**Joyce L. Connery**  
  
\_\_\_\_\_  
**Date**

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**  
**NOTATIONAL VOTE RESPONSE SHEET**

**FROM:** Jessie H. Roberson

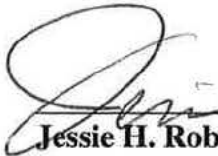
**SUBJECT:** Recommendation 2010-1 Closure Letter  
Doc Control#2016-200-006

Approved \_\_\_\_\_ Disapproved  X  Abstain \_\_\_\_\_

Recusal – Not Participating \_\_\_\_\_

**COMMENTS:** Below  X  Attached \_\_\_\_\_ None \_\_\_\_\_

**The Board should evaluate closure actions based on actions taken to address concerns raised in the actual Recommendation. Some issues were not addressed in the staff proposed letter justification because the Secretary did not accept all of the specific subrecommendations proposed by the Board. However, the Secretary did commit to addressing the Boards concerns by other means.**

  
\_\_\_\_\_  
Jessie H. Roberson

Sept 20, 2016  
Date

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**  
**NOTATIONAL VOTE RESPONSE SHEET**

**FROM:** Sean Sullivan

**SUBJECT:** Recommendation 2010-1 Closure Letter

**Doc Control#2016-200-006**

**Approved**  X                       **Disapproved** \_\_\_\_\_                      **Abstain** \_\_\_\_\_

**Recusal – Not Participating** \_\_\_\_\_

**COMMENTS:**      **Below**  X       **Attached** \_\_\_\_\_      **None** \_\_\_\_\_

I agree that Recommendation 2010-1, *Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers*, should be closed.

I agree that revisions made by DOE to its standards and directives have largely met the intent of the Recommendation.

However, with the benefit of clear 20-20 hindsight, I do not believe that nuclear safety has been significantly improved by the DNFSB's demand for rigid criteria covering the defense nuclear facility documented safety analysis (DSA) process. Recommendation 2010-1 was issued amidst a squabble between the DNFSB and DOE over the implications of a DSA which did not meet the department's accident analysis evaluation guideline. DNFSB insisted that the evaluation guideline of 25 Rem exposure to the maximally exposed offsite individual (MEOI) must be met, and where it was not met for an existing facilities that preceded the guideline's establishment, a formal plan was needed to meet the guideline. On the other hand, DOE insisted the guideline was merely one way to demonstrate adequate protection and that all existing facilities were safe as is. In the six years since Recommendation 2010-1 was issued, our agency has focused excessively on parameter selection and the related calculations performed during DSA development. As a result, DOE's contractors typically produce DSAs that meet the guideline, but they have done so in some cases by modifying inputs and revising parameter selections independent of any actual improvements to safety conditions. In short, we focused on the numbers, and they have responded by changing their numbers. This emphasis on numbers has obscured appropriate discussion of risk mitigation where mitigation is feasible by application of sound engineering and management principles.

DOE's DSA process involves postulating accidents, assessing whether a postulated accident is a credible event, calculating the potential exposure to nearby workers and the public



for an uncontrolled accident, and, if needed, designing controls to ensure the potential exposures remain low enough to avoid health and safety risks. (A good primer on the DSA process is available at: <http://energy.gov/ea/downloads/us-department-energy-oak-ridge-operations-office-nuclear-facility-safety-basis>) The process for any given defense nuclear facility necessarily entails the making of several assumptions. Consider, for example, a hypothetical earthquake that damages a container storing nuclear material. How much material will be released from the damaged container? Will the material remain localized as solid debris, or will it be made airborne by hot gasses in a post-seismic fire? How much radioactivity-laden smoke might escape the facility through doors opened by evacuating workers? What will be the wind speed and direction? How close to the site fence line might a member of the general public reasonably be, and how long might she linger at that location? The answers to each of these questions generates a parameter. The multiplication of several parameters is needed to determine the postulated dose to a hypothetical member of the general public. A small change in one parameter can cause a large change in the output after that one parameter is multiplied by several others.

DOE's many defense nuclear facilities are unique, special purpose facilities with widely varying conditions. As a result, contractors generally lack sufficient data to determine a precise numerical value for many analysis parameters. The process necessarily involves a lot of assumptions – albeit informed assumptions. No matter how rigid the rules may be, the outcome is and always will be susceptible to manipulation of the inputs.

Consider the history of the DSA for the nation's plutonium facility at Los Alamos, PF-4. In 2008 NNSA approved a DSA for PF-4 that estimated exposure to the MEOI from a seismically-induced fire accident could be in excess of two orders of magnitude above the evaluation guideline, precipitating Board Recommendation 2009-2 advising the Secretary to upgrade safety class structures in PF-4. While DOE accepted 2009-2, NNSA senior management nevertheless took the position that the approved DSA met all requirements. The Board then issued Recommendation 2010-1, advising the Secretary to create more rigid criteria for DSAs. Subsequently, the PF-4 DSA was revised with a new maximum exposure of 23 Rem, just below the evaluation guideline. As documented in a Board letter dated June 18, 2012, the reduced exposure resulted partly from the actual safety improvements prompted by 2009-2 and partly from the change of four parameters considered in the estimation. The Board disagreed with the technical justification for those parameter changes and concluded the proper exposure after taking into account the physical upgrades was about 100 Rem to the MEOI, well in excess of the evaluation guideline. NNSA responded by letter dated November 5, 2012, defending the conservatism in its DSA while acknowledging that continued refinements were necessary. Subsequent refinements have not changed the NNSA bottom line: calculated maximum off-site exposure is currently 24.23 Rem, just a hair below the evaluation guideline.

To NNSA's credit, many improvements have been made since 2008 reducing actual risk at PF-4. However, as documented in the Board's technical report No. 39, sent to NNSA by letter dated September 21, 2015, many opportunities for further risk reduction remain. That opportunities exist can be demonstrated by a simple, unanswerable question: Why does a pit-manufacturing facility that is not currently manufacturing any pits require an inventory limit as high as 1.8 metric tons of plutonium-239 equivalent material?

To NNSA's further credit, more improvements are planned, including new construction of modules that could house some of the PF-4 activities and/or a vault, permitting a significant



reduction of the material at risk in the existing facility. However, although this improvement and others will significantly improve actual safety, they are not recognized as safety improvements. They are considered only as operational improvements needed to meet a capacity goal of 50-80 pits-per-year. A 2015 Congressional Research Service report has already suggested to Congress that changing the way the DSA is calculated and/or moving the site fence line would allow for an increased inventory in the existing facility, thus meeting the operational need without the cost of new construction. Sometime in the next decade it seems likely that a new administration or a new Congress will take aim at the proposed new construction in order to save money. These improvements should be recognized as necessary for safety as well as operations.

Almost a decade after a DOE-required periodic reanalysis of the seismic threat at Los Alamos first indicated a fourfold increase in seismic motion, there is still no assurance that PF-4 will withstand a design basis earthquake. There is no off-the-shelf computer program to predict accurately the effects of ground motion on a facility that is actually three adjoining buildings with a common flat roof supported by columns. No one would build such a facility in an area with a known significant seismic risk. Even if the structure survives a design basis seismic event, the fire suppression system may not. See the staff issue report sent to NNSA under Board cover letter dated May 12, 2016. Moreover, NNSA's risk reduction plans have been stalled by two events: 1) the radioactive release event at WIPP which was caused by a mistake at LANL and has stopped all waste shipments from LANL to WIPP, and 2) the PF-4 operations pause resulting from criticality safety concerns, which has caused criticality safety resources to be applied exclusively to operations restart, thereby preventing risk reduction through better material containment within PF-4. Yet, the numbers say that the maximum exposure to a member of the public is 24.23 Rem and so long as the discussion of safety remains focused on numbers, all appears well.

Recommendation 2010-1 sought "a clear and unambiguous set of nuclear safety requirements to ensure that adequate protection of the public, workers, and the environment is provided." DOE has revised their standards for DSA development, and many requirements have been clarified and improved. Still, there is no mathematical formula that can assure adequate protection. In hindsight, I am not sure that what the Board sought in Recommendation 2010-1 is attainable. Application of sound engineering and management principles requires some measure of judgment, and judgment cannot be defined by 'a clear and unambiguous' set of rules.



**Sean Sullivan**

9/21/16

**Date**

**Shelby Qualls**

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**From:** Daniel J. Santos  
**Sent:** Monday, September 19, 2016 4:49 PM  
**To:** Shelby Qualls; Lotus Smith  
**Subject:** RE: Notational Vote: Doc#2016-200-006, Recommendation 2010-1 Closure Letter - BLUE FOLDER

Disapproved.

**From:** Shelby Qualls  
**Sent:** Monday, September 19, 2016 3:10 PM  
**To:** Bruce Hamilton <[REDACTED]>; Daniel J. Santos <[REDACTED]>; Jessie Roberson <[REDACTED]>; Joyce Connery <[REDACTED]>; Sean Sullivan <[REDACTED]>  
**Cc:** James Biggins <[REDACTED]>; Katherine Herrera <[REDACTED]>; ExSec <[REDACTED]>  
**Subject:** Notational Vote: Doc#2016-200-006, Recommendation 2010-1 Closure Letter - BLUE FOLDER

This email is an electronic record of Notational Vote. Voting ballot will follow shortly. Also, accepting electronic votes.

This version incorporates the changes approved in Notational Vote Doc#2016-200-006A, Amendment by Board Member Sean Sullivan to YELLOW FOLDER Doc#2016-200-006, Recommendation 10-1 Closure Letter. A redline-strikeout version is attached showing the changes.

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD  
NOTATIONAL VOTE RESPONSE SHEET**

**FROM:** Members of the Board  
**SUBJECT:** Recommendation 2010-1 Closure Letter

**DOC#2016-200-006**

**Approved** \_\_\_\_\_  
**Disapproved** \_\_\_\_\_  
**Abstain** \_\_\_\_\_  
**Recusal – Not Participating** \_\_\_\_\_

**COMMENTS:**

**Below** \_\_\_\_\_  
**Attached** \_\_\_\_\_  
**None** \_\_\_\_\_

Shelby Qualls  
Assistant Executive Secretary  
Office of the Chairman

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**  
**NOTATIONAL VOTE RESPONSE SHEET**

**FROM:** Bruce Hamilton

**SUBJECT:** Recommendation 2010-1 Closure Letter

**Doc Control#2016-200-006**

**Approved**  **Disapproved**  **Abstain**

**Recusal - Not Participating**

**COMMENTS:** **Below**  **Attached**  **None**

  
**Bruce Hamilton**

19 SEPT 2016  
**Date**