

Sean Sullivan, Chairman
Bruce Hamilton, Vice Chairman
Jessie H. Roberson
Daniel J. Santos
Joyce L. Connery

**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

Washington, DC 20004-2901



The Honorable Frank G. Klotz
Administrator
National Nuclear Security Administration
U.S. Department of Energy
100 Independence Avenue, SW
Washington, DC 20585-0701

Dear Administrator Klotz:

The Defense Nuclear Facilities Safety Board (Board) has been reviewing the design of the Uranium Processing Facility (UPF), and in particular, the safety strategies being employed. Members of the Board's staff conducted a review of the Preliminary Safety Design Report as the project prepares to enter final design. This letter constitutes our project letter at this phase of design.

The enclosure describes opportunities for improvement related to the UPF safety strategy for fire protection. We will continue to follow the National Nuclear Security Administration's efforts to integrate safety into the design as the UPF project proceeds through design and construction.

Sincerely,

Sean Sullivan
Chairman

Enclosure

Enclosure

The Uranium Processing Facility (UPF) Preliminary Safety Design Report and Preliminary Fire Hazards Analysis contain the latest project safety strategy. Review by members of the Board's staff found weaknesses in the revised fire safety strategy resulting from the elimination of thermal barriers and deficiencies in compliance with industry codes and standards. The staff review team identified the following three opportunities for improvement:

Fire Suppression System (FSS) Safety Classification—The UPF FSS is not classified as a safety system, but the UPF design relies on it to prevent accidents with the highest unmitigated consequences. These accidents include a large facility fire and a nuclear criticality accident that follows a design basis seismic event. The project's original strategy included thermal barriers to prevent a criticality accident by protecting fissile material from a post-seismic fire. The project has since eliminated most thermal barriers from the UPF design, thereby increasing the importance of the FSS in preventing a criticality accident. The Board's staff team believes that, given the FSS's increased contribution to the safety posture of the facility, it would be prudent to designate the FSS as safety-significant. Upgrading the FSS to a safety-significant designation would require the FSS to be designed, procured, and maintained in accordance with American Society of Mechanical Engineers NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*, and would require surveillance of this system to be conducted under Technical Safety Requirements. This increased rigor will increase confidence that the FSS can perform its required safety functions during and following design basis accidents.

FSS Diesel Pumps Limit State Designation—The UPF FSS pumps are credited as seismic design category (SDC)-2, limit state B. According to American Nuclear Society Standard 2.26-2004, *Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design*, a limit state B designation will not guarantee functionality of deformation-sensitive equipment, such as a fire pump, after the design basis seismic event (SDC-2). Thus, functionality of the FSS after the design basis seismic event cannot be guaranteed. During the review by the Board's staff team, project personnel stated that although the FSS pumps are designated limit state B, the project would test them to the more stringent limit state D requirements. However, the Board's staff team reviewed the UPF project pump testing specification, which invokes commercial testing requirements, and found that the pumps would only be tested to SDC-2, limit state B, loading levels. Testing these pumps to limit state D as suggested by UPF project personnel would improve confidence in their ability to perform their safety function.

Combustible Glovebox Windows—Gloveboxes that will contain material-at-risk (MAR) serve as the primary confinement boundary for UPF and are designed in accordance with DOE Order 420.1C, *Facility Safety*. The DOE Order requires applying industry consensus standards to the design and fabrication of gloveboxes. National Fire Protection Association 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials*, and American Glovebox Society G010, *Standard of Practice for Glovebox Fire Protection*, require the use of

non-combustible glovebox windows. However, the UPF project plans to use a combustible material without demonstrating fire performance equivalent to non-combustible materials. In addition, the currently specified material for glovebox windows could melt when exposed to fire, resulting in a breached primary confinement. Either using a non-combustible window material or demonstrating that the material selected by the UPF project provides equivalent performance would improve the reliability of the facility's primary confinement for MAR.

AFFIRMATION OF BOARD VOTING RECORD

SUBJECT: UPF PSDR Project Letter

Doc Control#2017-100-061

The Board, with Board Member(s) Sean Sullivan, Bruce Hamilton, Jessie H. Roberson, Daniel J. Santos, Joyce L. Connery *approving*, Board Member(s) none *disapproving*, Board Member(s) none *abstaining*, and Board Member(s) none *not participating*, have voted to approve the above document on June 26, 2017.

The votes were recorded as:

	APRVD	DISAPRVD	ABSTAIN	NOT PARTICIPATING*	COMMENT	DATE
Sean Sullivan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	06/26/17
Bruce Hamilton	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	06/21/17
Jessie H. Roberson	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	06/21/17
Daniel J. Santos	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	06/22/17
Joyce L. Connery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	06/22/17

*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.


Assistant 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: Sean Sullivan

SUBJECT: UPF PSDR Project Letter

Doc Control#2017-100-061

Approved X Disapproved Abstain

Recusal – Not Participating

COMMENTS: Below Attached None X



Sean Sullivan

6/20/17

Date

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

FROM: Bruce Hamilton


SUBJECT: UPF PSDR Project Letter

Doc Control#2017-100-061

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

Recusal – Not Participating

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


Bruce Hamilton

21 JUNE 2017
Date

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
NOTATIONAL VOTE RESPONSE SHEET

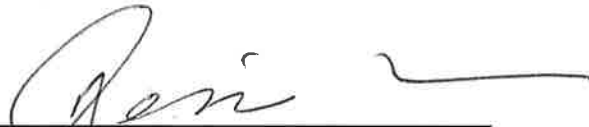
FROM: Jessie H. Roberson

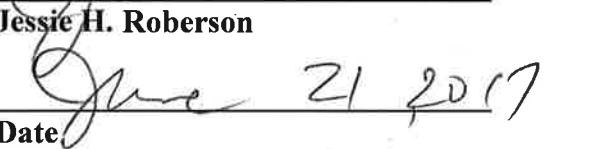
SUBJECT: UPF PSDR Project Letter

Doc Control#2017-100-061

Approved **Disapproved** **Abstain**
Recusal - Not Participating

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



Jessie H. Roberson


Date

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

FROM: Daniel J. Santos

SUBJECT: UPF PSDR Project Letter

Doc Control#2017-100-061

Approved X **Disapproved** _____ **Abstain** _____

Recusal – Not Participating _____

COMMENTS: **Below** _____ **Attached** _____ **None** X



Daniel J. Santos

_____ 6/22/17 _____
Date

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
NOTATIONAL VOTE RESPONSE SHEET

FROM: Joyce L. Connery


SUBJECT: UPF PSDR Project Letter

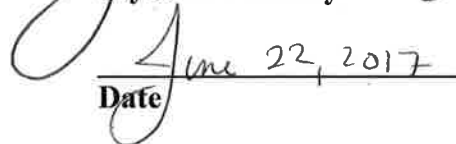
Doc Control#2017-100-061

Approved **Disapproved** **Abstain**

Recusal – Not Participating

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



Joyce L. Connery


Date