



# **DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

## **Fiscal Year 2021 President's Budget Request and Agency Overview**

*Presented to the*  
**Committee on Armed Services**  
**House of Representatives**

March 11, 2020



# Agenda

- **Board Overview**
- Budget Summary
- Board Activities
- Board Member Personal Remarks



# Board Overview

- “The mission of the Board shall be to provide independent analysis, advice, and recommendations to the Secretary of Energy to inform the Secretary, in the role of the Secretary as operator and regulator of the defense nuclear facilities of the Department of Energy, in providing adequate protection of public health and safety at such defense nuclear facilities, including with respect to the health and safety of employees and contractors at such facilities.”

## *Current Board Members*



**Chairman**  
Bruce Hamilton



**Vice Chairman**  
Vacant



**Board Member**  
Jessie Hill Roberson



**Board Member**  
Joyce Connery



**Board Member**  
Vacant

- Nominations/Renominations before the Senate:
  - Jessie Hill Roberson, term through 2023
  - Bruce Hamilton, term through 2022
  - Thomas Summers, term through 2020



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## Operating Expense Summary

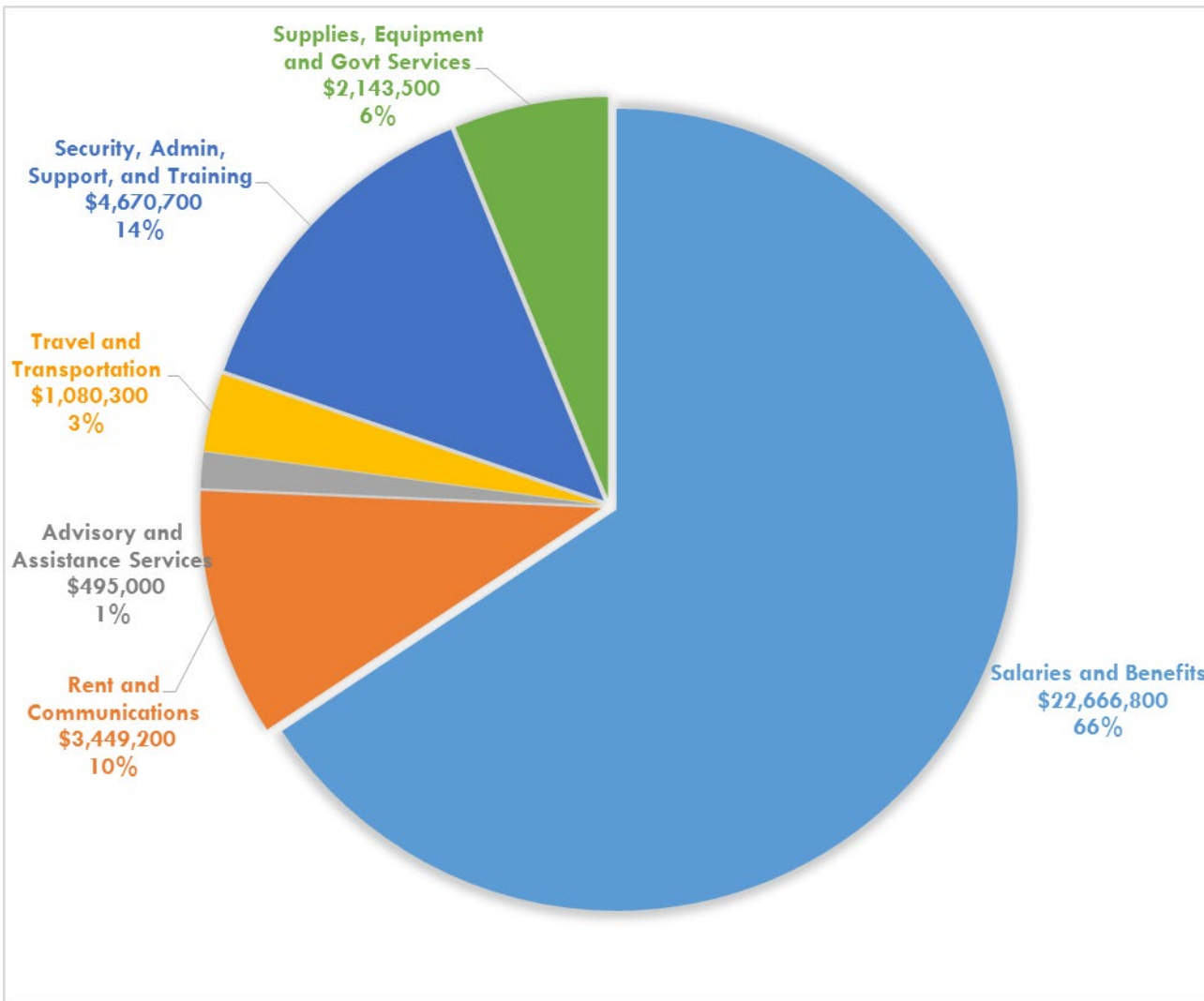
	FY 2019 Actual	FY 2020 Plan	FY 2021 Request
<b>Budget Authority</b>	31,000	31,000	28,836
<b>Obligations</b>	28,362	31,487	34,505
<b>Outlays</b>	26,007	29,598	32,435

## Personnel Summary

	FY 2019 Actual	FY 2020 Plan	FY 2021 Request
<b>Statutory Personnel (FTE) Ceiling</b>	130	130	130
<b>On-Board</b>	87	113	116
<b>FTE Usage</b>	87	100	114



# FY 2021 Projected Obligations by Major Category





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## DOE/DNFSB Interface

- The May 2018 version of DOE Order 140.1, *Interface with the Defense Nuclear Facilities Safety Board*, restricted the Board's access to information and facilities.
- The 2020 NDAA clarified the Board's authority.
  - DOE shall provide the Board with "prompt and unfettered access" to facilities, personnel, and information.
- DOE is revising DOE Order 140.1 in response to the NDAA.
  - Draft revision has removed elements contrary to the Atomic Energy Act.
- The Board is pursuing a memorandum of understanding with DOE to resolve operational interface issues.





## FY 2020 Hearings and Meetings

- March 19, 2020, Aiken, SC [Public Hearing on the Status of Savannah River Site]
- December 12, 2019, Washington, DC [Public Meeting on DOE's Implementation Plan for Recommendation 2019-1]
- October 28, 2019, Washington, DC [Public Meeting on DOE's basis for rejecting Recommendation 2019-2]
- Closed Meetings
  - January 24, 2020, Washington, DC
  - November 21, 2019, Washington, DC
  - October 16, 2019, Washington, DC



# Board Recommendations

- Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant*
  - After the staff completed a review of the effectiveness of DOE actions, the Board closed Recommendation 2011-1 on July 30, 2019
- Recommendation 2012-1, *Savannah River Site Building 235-F Safety*
  - DOE stopped removing Pu-238; instead, DOE is removing combustibles and preparing to render the facility cold and dark
- Recommendation 2012-2, *Hanford Tank Farms Flammable Gas Safety Strategy*
  - DOE installed equipment to monitor double-shell tank ventilation, which significantly improves safety by providing assurance flammable gases are being removed from tank headspaces
  - DOE has proposed closure of this recommendation
- Recommendation 2015-1, *Emergency Preparedness and Response at Pantex*
  - The Board closed Recommendation 2015-1 on February 6, 2019



# Board Recommendations

- Recommendation 2019-1, *Pantex Uncontrolled Hazard Scenarios and 10 CFR 830 Implementation*
  - Board identified inadequacies in implementation plan during Board's December 2019 public meeting; DOE/NNSA revising plan
- Recommendation 2019-2, *Safety of the Savannah River Tritium Facilities*
  - DOE rejected Recommendation, staff focusing on NNSA proposed activities
- Recommendation 2020-1, *Nuclear Safety Requirements*
  - DOE response pending



## Recommendation 2019-2, *Safety of the Savannah River Tritium Facilities*

- The Tritium Facilities' safety analysis calculated dose consequences over **6,000 rem onsite** for several accident scenarios after implementation of safety controls, far exceeding DOE's own safety standards.
- Board recommended that DOE:
  1. Identify and implement near-term compensatory measures to mitigate the potential for high radiological consequences.
  2. Identify and implement long-term actions and controls to prevent or mitigate the hazards that pose significant radiological consequences.
  3. In parallel with the above recommendations, evaluate the adequacy of the safety management programs and upgrade them as necessary.
- DOE rejected the Board's recommendation.
  - Board's March 19, 2020, public hearing in Aiken, SC, to cover actions to address the safety issues.



# Recommendation 2020-1, *Nuclear Safety Requirements*

- The Board approved Recommendation 2020-1 on February 20, 2020. The Recommendation is intended to strengthen DOE’s nuclear safety regulatory framework, including DOE’s rules, orders, standards, and implementation.
- The Board recommends that DOE:
  1. Develop an approach and requirements for management of aging infrastructure
  2. Retain current approach to hazard categorization in 10 CFR 830
  3. Evaluate and improve the efficiency of the DOE safety basis approval process
  4. Add key requirements to 10 CFR 830 for processes that have been implemented or updated since the rule was issued:
    - Justification for continued operations
    - Evaluations of the safety of a situation
    - Unreviewed safety questions
    - Technical safety requirements
    - Defense in depth
    - Specific administrative controls

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**DEPARTMENT OF ENERGY****10 CFR Part 830****RIN 1992-AA57****Nuclear Safety Management****AGENCY:** Office of Environment, Health, Safety and Security, U.S. Department of Energy.**ACTION:** Notice of proposed rulemaking and notice of public meetings.



# Pantex Plant

- Recommendation 2019-1
  - Inadequately controlled high consequence hazard scenarios
  - Aspects of safety basis process do not meet 10 CFR 830 requirements
  - DOE/NNSA revising implementation plan with input from Board's staff
- Recommendation 2015-1 – emergency preparedness and response
  - Implementation completed and closed
- Nuclear explosive safety
  - Evaluation of proposed B61-12 nuclear explosive operations
  - Denial of access to nuclear explosive safety study deliberations
- Planned safety improvements
  - Seismic qualification of facilities and appurtenances
  - Probabilistic seismic hazard analysis update

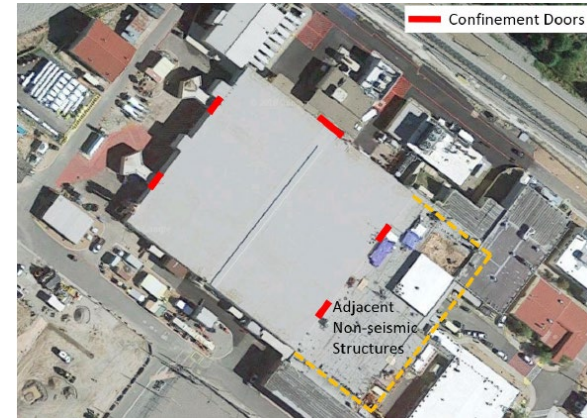


Weapons Manufacturing Operations



# Los Alamos National Laboratory

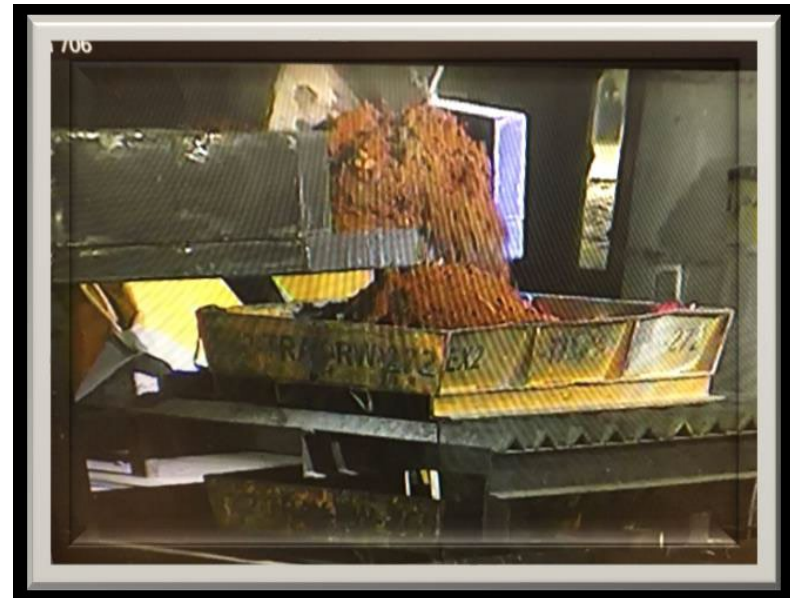
- Plutonium Facility Deficiencies
  - Continued delays with safety system upgrades (ventilation, fire suppression, fire barriers).
  - Safety basis weaknesses (non-conservative accident progression, passive confinement, inappropriate dose conversion)
- Waste Management Challenges
  - Transuranic waste hazards and controls.
  - Venting potentially flammable Flanged Tritium Waste Containers.
  - Resuming transuranic waste remediation at Area G.
- Radiological Laboratory Utility Office Building Deficiencies
  - NNSA upgrading to Hazard Category 3 nuclear facility.
  - Contractor found multiple facility deficiencies (ventilation, fire suppression, fire barriers, fire hazard analysis).
  - Contractor continuing to assess extent of problems, develop listing of gaps and proposed remedies.





# Idaho National Laboratory Waste Activities

- Board continues analyzing complex-wide implications of April 2018 solid waste drum over-pressurization event in Accelerated Retrieval Project (ARP) V, including flammable gas analyses
  - Board is engaging with DOE on revision to DOE-STD-5506, *Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities*
- Board is monitoring preparations to commence processing of radioactive sodium-bearing waste in the Integrated Waste Treatment Unit.
- TRU Waste Management
  - Limited certification of INL waste due to several obstacles
  - Issues with integrity of containers shipped to WIPP
  - Approximately 2400 drums of challenging sludge waste to be processed at ARP VII
  - RCRA closure of AMWTP facilities







# Waste Isolation Pilot Plant Operations

- Board is reviewing the safety basis, design and construction of the new Safety Significant Confinement Ventilation System, and waste management beyond WIPP.
- Near-term challenges:
  - Increasing underground air-flow by restarting the 700 series fans while maintaining a safe ventilation configuration.
  - Improving inspection and maintenance of underground vehicles to avoid an accident and reduce the risk of an underground fire.
  - Design, procurement, and construction of the Significant Safety Confinement Ventilation System.
  - Continuing adequate ground control at WIPP and ensuring the underground remains viable.



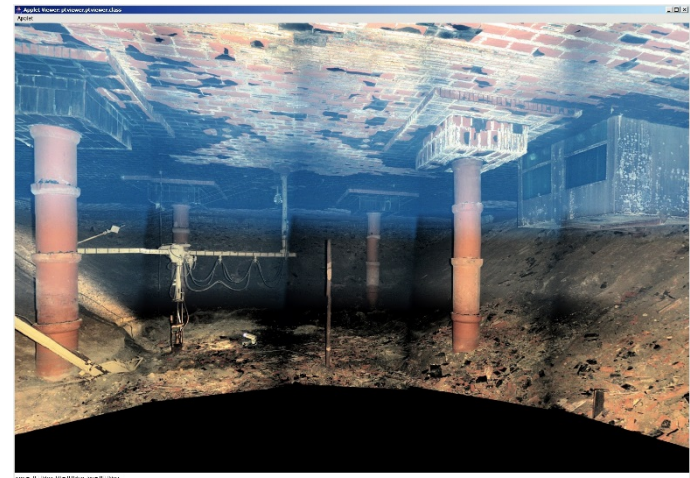


# Hanford: Decontamination and Demolition of Legacy Facilities

- Managing and removing deactivated high hazard plutonium production and processing facilities
  - Completion of Plutonium Finishing Plant demolition
  - Preparations to retrieve highly contaminated soil from beneath Building 324
  - Stabilization of degraded, high-hazard, underground structures
- Three of the four major contractors that support Hanford Site work are being replaced
  - Transition of contractor management and operational processes
  - In parallel, DOE oversight methods and practices are also changing
  - Workforce must maintain focus on high hazard work during contract transition period



Workers bag waste out of the Building 324 Hot Cell Airlock



Inside 219-Z-9 Crib



# Hanford: Management, Retrieval, and Disposition of Liquid Waste

- Management of aging tank farm infrastructure
  - 242-A evaporator repairs
  - Tank integrity program
  - Upgrades to safely extend usable life of existing infrastructure
- Creating infrastructure and capability to support 24/7/365 operation of Direct Feed Low Activity Waste process for vitrification of tank waste
  - A/AX Tank Farm single-shell tank retrievals
  - Upgrade of Liquid Effluent Retention and Effluent Treatment Facilities
  - Tank Side Cesium Removal system startup
- Low Activity Waste Facility (LAW) startup
  - System and integrated testing
  - Documented Safety Analysis implementation



Tank Side Cesium Removal System Process Enclosure



LAW Facility Control Room



# Savannah River Site: Multiple Activities and Interests

- Tritium Facilities
  - Design basis accidents with large onsite consequences
  - Conceptual design for planned Tritium Finishing Facility
- Processing & storage of nuclear materials
  - Plutonium storage and down-blend
  - Spent nuclear fuel storage and processing
  - High-level waste storage and processing
- Start up of Salt Waste Processing Facility
  - Recent completion of Contractor and federal Operational Readiness Reviews
- Conceptual design for the Savannah River Plutonium Production Facility



Savannah River Site (SRS) L-Area  
Spent Fuel Basin



SRS Salt Waste Processing Facility



# Y-12 National Security Complex and ORNL

- Y-12
  - Nuclear criticality safety program
  - Uranium accumulation in active and out-of-service equipment
  - Reactive materials stored in Highly Enriched Uranium Materials Facility
  - Construction of Uranium Processing Facility
  - Integrated safety management program
- ORNL
  - Downblending of U-233 oxide powders, metals, monoliths, and salts for offsite disposal
  - Oxidation of fissile metals at Transuranic Waste Processing Center
  - Oak Ridge Oxide Processing Campaign (commercial isotope recovery)



Y-12 National Security Complex



U-233 Processing in Glovebox

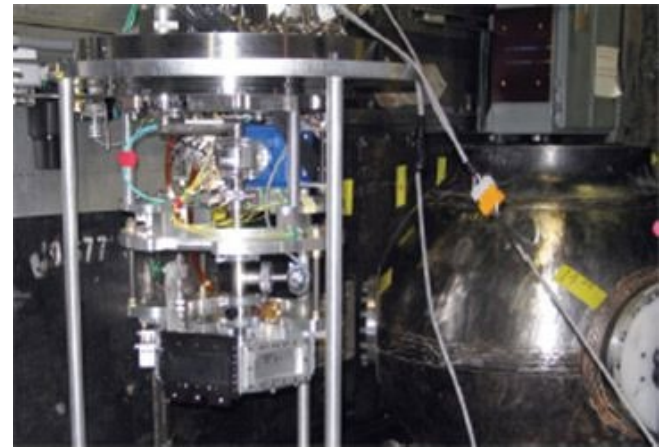


# Nevada National Security Site

- Device Assembly Facility/National Criticality Experiments Research Center
  - Structural analysis update
  - Revised safety basis to remove nuclear explosive operations
  - Restart of downdraft table operations
- U1a Complex
  - Adequacy of hoist control system
  - Improvements to confinement vessels due to leak from a 2019 experiment
  - Mining for the Enhanced Capabilities for Subcritical Experiments project



Device Assembly Facility Structure



Subcritical Experiment Vessel and Instrumentation

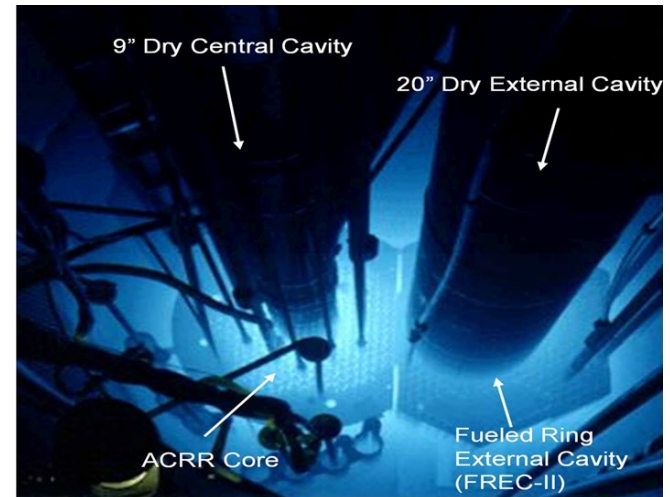


# Lawrence Livermore and Sandia National Laboratories

- LLNL Plutonium Facility New Recovery Glovebox Line
  - Supports new programmatic needs
  - Three new glovebox lines connected by liquid transfer line
  - Safety basis revisions required prior to startup
- SNL Annular Core Research Reactor
  - Critical lift failures (nickel plate and fuel element rack)
  - Degraded conditions in the core (Safety Rod 1, Fuel Element 134, Control Rod 5)
  - Conduct of operations and conduct of maintenance challenges/issues



LLNL Plutonium Facility Recovery Glovebox Line



SNL Annular Core Research Reactor



# Aging Infrastructure

- Aging facilities are prone to:
  - Degraded systems and structures
  - Increased radiological hold-up
  - Obsolescent equipment and unavailable replacement parts
  - Retrofits to meet evolving missions
  - Repurposing for new missions
- Board monitoring DOE efforts to mitigate risks and develop replacement capabilities
  - Y-12 Extended Life Program
  - LANL Plutonium Strategy
  - Pantex ramps structural retrofits and safety system upgrades
  - Hanford Site electrical infrastructure and systems
  - SRS H-Canyon exhaust tunnel age-related degradation



Y-12 and Pantex Infrastructure Upgrades



Los Alamos Chemistry, Metallurgy, and Research (CMR) Facility





# Design and Construction

- Focus of Board reviews
  - Before construction: Safety basis and safety-related structures, systems, & components
  - During construction: Quality assurance and operability testing of safety systems
- More than a dozen new facilities under Board purview
  - Hanford Waste Treatment and Immobilization Plant and related facilities
  - Y-12 Uranium Processing Facility
  - Savannah River Plutonium Processing Facility
  - Savannah River Site Tritium Finishing Facility
  - Pantex Material Staging Facility



Savannah River Plutonium Processing Facility



Hanford Waste Treatment and Immobilization Plant



# Safety Management Programs

- DOE increasingly relies on administrative controls rather than engineered controls to ensure adequate protection of public health & safety.
- Examples of Board reviews focused on administrative controls and safety programs:
  - DOE policies and directives
    - DOE Standard-1027, *Hazard Categorization*
    - DOE Standard 5506, *Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities*
    - DOE Standard 3014, *Accident Analysis for Aircraft Crash into Hazardous Facilities*
    - STD-1158, *Self-Assessment Standard for DOE Contractor Criticality Safety Programs*
  - Emergency Preparedness and Response
    - Verification and validation of DOE response to Recommendation 15-1, *Emergency Preparedness and Response at the Pantex Plant*
  - Criticality Safety review and Board visit to Y-12
  - Safety Culture corrective action review at WTP
  - Complex-wide review of DOE oversight
  - Complex-wide review of aspects of technical safety requirement implementation





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**AFFIRMATION OF BOARD VOTING RECORD**

**SUBJECT:** RFBA by Chairman Hamilton to authorize the attached slide deck for use when briefing Congressional staff

**Doc Control#:** 2020-300-0015

The Board acted on the above document on 03/10/2020. The document was Approved.

The votes were recorded as:

	APRVD	DISAPRVD	ABSTAIN	NOT PARTICIPATING	COMMENT	DATE
Bruce Hamilton	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	03/09/2020
Jessie H. Roberson	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	03/10/2020
Joyce L. Connery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	03/10/2020

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

*Nicholas Moore*

Executive Secretary to the Board

Attachments:

1. Voting Summary
2. Board Member Vote Sheets

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**NOTATIONAL VOTE RESPONSE SHEET**

**FROM:** Bruce Hamilton

**SUBJECT:** RFBA by Chairman Hamilton to authorize the attached slide deck for use when briefing Congressional staff

**Doc Control#:** 2020-300-0015

**DATE:** 03/09/2020

**VOTE:** Approved

**COMMENTS:**

None

*Bruce Hamilton*

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**NOTATIONAL VOTE RESPONSE SHEET**



**FROM:** Jessie H. Roberson

**SUBJECT:** RFBA by Chairman Hamilton to authorize the Attached Slide Deck for Use  
When Briefing Congressional Staff

**Doc Control#2020-300-015**

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

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

  
\_\_\_\_\_  
**Jessie H. Roberson**  
  
\_\_\_\_\_  
**Date**

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**NOTATIONAL VOTE RESPONSE SHEET**

**FROM:** Joyce L. Connery

**SUBJECT:** RFBA by Chairman Hamilton to authorize the attached slide deck for use when briefing Congressional staff

**Doc Control#:** 2020-300-0015

**DATE:** 03/10/2020

**VOTE:** Approved

**Member voted by email.**

**COMMENTS:**

None

*Joyce L. Connery*

## Nicholas Moore

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**From:** Joyce Connery  
**Sent:** Monday, March 09, 2020 3:10 PM  
**To:** Nicholas Moore  
**Subject:** Re: Notational Vote Doc#2020-300-0015, RFBA by Chairman Hamilton to authorize the Attached Slide Deck for Use When Briefing Congressional Staff - BLUE FOLDER

I concur

Sent from my iPhone

> On Mar 9, 2020, at 10:56 AM, Nicholas Moore [REDACTED] wrote:

>

>