The Secretary of Energy
Washington, DC 20585

June 27, 2022

The Honorable Joyce Connery
Chair, Defense Nuclear Facilities Safety Board
625 Indiana NW, Suite 700
Washington, DC 20004

Dear Chair Connery:

On September 8, 2021, the Department of Energy (DOE) accepted the Defense Nuclear Facilities Safety Board's (Board) Recommendation 2020-1, *Nuclear Safety Requirements*. Enclosed is the DOE Implementation Plan (IP) responding to the Recommendation.

The IP details DOE's approach and actions to address Recommendation 2020-1. The Department is confident that execution of this IP will improve DOE's nuclear safety framework and meet the underlying safety improvement objectives of Recommendation 2020-1. DOE appreciates the Board's advice and will continue working closely with the Board throughout the IP timeline as we strive toward our shared objectives of sustained improvements to the effectiveness and efficiency of DOE's nuclear safety framework, and continuing to ensure adequate protection of environment, public, and worker health and safety at DOE defense nuclear facilities. To that end, DOE appreciates and values the collaboration and input from the Board staff during the development of this IP, and I expect that this collaboration will continue as the Department improves processes, standards, directives, and rules during the execution of the IP.

I have assigned Mr. Garrett Smith as the Responsible Manager for this IP. Mr. Smith is the Director of the Office of Nuclear Safety within the DOE Office of Environment, Health, Safety and Security, and can be reached at (301) 903-7440.

Sincerely,

Jennifer Granholm

Enclosure

U. S. Department of Energy

Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2020-1: *Nuclear Safety Requirements*

Washington, DC 20585

June 2022

1.0 PURPOSE

The purpose of this Implementation Plan (IP) is to specify Department of Energy (DOE) actions for addressing Defense Nuclear Facilities Safety Board (Board or DNFSB) Recommendation 2020-1, *Nuclear Safety Requirements*.

2.0 BACKGROUND

The Board revised and reaffirmed Recommendation 2020-1 on June 1, 2021, which identified thirteen specific sub-recommendations:

1. **Aging Infrastructure**
   a. Develop and implement an integrated approach, including requirements, for the management of aging infrastructure that includes formal processes to identify and perform infrastructure upgrades necessary to ensure facilities and structures, systems, and components can perform their safety functions.

2. **Hazard Categories**
   a. Revise DOE Standard 1027-2018 to address the deficiencies noted in the Board's January 19, 2021, letter.
   b. Mandate use of the updated version of DOE Standard 1027 when performing hazard categorization of new defense nuclear facilities.
   c. Review existing hazard category 3 and below hazard category 3 defense nuclear facilities to confirm that they are appropriately categorized.

3. **DOE Approvals**
   a. Establish requirements in DOE Standard 1104 for timely periodic DOE reviews of facility safety bases to ensure they meet the requirements of 10 CFR 830.
   b. Establish clear requirements in DOE Standard 1104 for DOE approval of Justifications for Continued Operations (JCOs) and Evaluations of the Safety of the Situation (ESSs) for Potential Inadequate Safety Analyses (PISAs) that result in a positive Unreviewed Safety Question (USQ) determination.
   c. Update 10 CFR 830 to incorporate the requirements established per items 3.a and 3.b.

4. **Evaluation of Documented Safety Analysis (DSA) Preparation and Review Processes**
   a. Conduct an independent review of contractor and federal processes to identify and evaluate the underlying issues that prevented the annual submittal and approval of high-quality safety basis documents and use the findings to improve the relevant processes.

5. **Safety Basis Process and Requirements**
   a. Establish clear requirements for USQs and JCOs in an order or invoked standard, including elevation of key concepts and guidance from DOE Guide 424.1-1. While developing these requirements, address issues discussed in the Board's July 10, 2020, letter.

b. Establish clear requirements for Technical Safety Requirements (TSRs) in an order or invoked standard, including elevation of key concepts and guidance from DOE Guide 423.1-1. While developing these requirements, address issues discussed in DNFSB Technical Report 45, *Violations of the Nuclear Safety Basis*.
c. Establish requirements for Specific Administrative Controls (SACs) by invoking DOE Standard 1186 in an appropriate DOE order.
d. Update 10 CFR 830 to incorporate the requirements established per items 5.a through 5.c.
e. Establish requirements in 10 CFR 830 regarding the concept of defense-in-depth.

The initial issuance of Recommendation 2020-1, dated February 21, 2020, asserted that DOE's August 2018 proposed revisions to Title 10 Code of Federal Regulations (CFR) Part 830, *Nuclear Safety Management*, would erode DOE's nuclear safety regulatory framework. DOE disagreed with the DNFSB's assertions in DOE's June 11, 2020, response, which states that the changes to 10 CFR Part 830 will improve the effectiveness and efficiency of DOE's nuclear safety framework while continuing to ensure adequate protection of public and worker health and safety across the DOE complex. On October 19, 2020, DOE published the Final Rule amending 10 CFR Part 830, addressing and incorporating comments from the DNFSB and members of the public as part of the formal rulemaking process.

Pursuant to 42 United States Code Section 2286d paragraph (e), when the Secretary of Energy does not fully accept a Recommendation, the Board must either reaffirm or revise the recommendation. The Board revised and reaffirmed the Recommendation in a June 1, 2021, letter to the Secretary of Energy. Given DOE's response to the recommendation, and DOE's completion of the 10 CFR Part 830 rulemaking, the Board made the following revisions to Recommendation 2020-1:

- Modified sub-recommendations related to facility hazard categorization to reflect DOE's actions in the final rulemaking, and the results of a subsequent Board review of DOE hazard categorization standards;
- Combined sub-recommendations on causal analysis reviews. This sub-recommendation was also revised to reflect DOE's actions in final rulemaking to remove the annual approval requirement; and
- Modified remaining sub-recommendations to reflect DOE's completion of rulemaking to incorporate additional relevant Board correspondence issued since the original recommendation was transmitted, and to provide additional clarity on the intent of the sub-recommendations.

In a September 8, 2021, letter, the Secretary of Energy responded with the Final Decision to accept Recommendation 2020-1. The Secretary of Energy stated that following the Department's recent evaluation of the revised and reaffirmed June 1, 2021, Recommendation, the Department "continues to conclude that its current regulatory framework, as revised by the October 2020 rulemaking, provides adequate protection of public and worker health and safety across the DOE complex." The letter and enclosure updates DOE's June 11, 2020, response for several sub-recommendations to reflect revisions to Recommendation 2020-1.

The enclosure to the September 8, 2021, letter presents a detailed response for each DNFSB sub-recommendation, which reflects the Department's acceptance of Recommendation 2020-1. While accepting Recommendation 2020-1, DOE accepts sub-recommendations 3.c, 5.d, and 5.e with the understanding that DOE cannot commit to a specific outcome in a future rulemaking, since such a commitment would be inconsistent with the requirements of the Administrative Procedure Act. DOE will perform a regulatory analysis to evaluate whether changes to 10 CFR Part 830 should be pursued through a future rulemaking effort.

This Implementation Plan details DOE's actions to address these sub-recommendations.

3.0 BASELINE ASSUMPTIONS

The key baseline assumptions associated with this Implementation Plan are as follows:

- Implementation actions will be consistent with the Secretary's September 8, 2021, Final Decision regarding DNFSB Recommendation 2020-1.
- Ongoing work on revisions to DOE Technical Standards and Directives regarding nuclear safety policy would continue, including DOE Guide (G) 424.1-1C, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements,* and DOE-Standard (STD)-1104-2016, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*. By completing DOE's current efforts to revise and issue the Guide and Standard, DOE may then use the updates to further inform the commitments specified in this IP.
- Interim Milestones identified within the IP are provided for information and are not formal deliverables.
- During the execution of this IP, DOE will interact with the DNFSB and staff regularly, either through periodic briefings or collaborative discussions, as DOE works to update its processes, standards, directives, and rules. As appropriate, DOE will share drafts of these updates with the DNFSB. Frequent interactions with the DNFSB and staff will ensure that, as DOE completes these activities, full consideration is given to issues raised by the DNFSB and staff.
- DOE and DNFSB interactions will adhere to the February 17, 2022, "Memorandum of Understanding Between the U.S. Department of Energy and the Defense Nuclear Facilities Safety Board."

4.0 NEAR-TERM ACTIONS AND RELATED ACTIVITIES

A primary action supporting this recommendation is to revise or assess potential revisions to DOE's nuclear safety regulatory framework, including technical standards and directives related to nuclear safety in order to establish improved and/or additional safety basis requirements. DOE has already implemented a program and schedule to revise nuclear safety directives and technical standards and will continue this effort in support of this recommendation.

The revision of DOE G 424.1-1C, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements,* has been underway since 2019. One of the main objectives of the revision was to revise the Guide to align with the recent changes to 10 CFR Part 830. DOE intends to continue and finalize the ongoing revision of the USQ Guide. Once the Guide is

approved and issued, it will serve as a reference for the development of the USQ requirements described in Section 5.0 of this IP. Additionally, a revision to DOE-STD-1104-2016, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents,* was initiated to implement the 2020 changes in 10 CFR Part 830. Work on the revision of DOE-STD-1104-2016 will continue towards the completion of Milestones in Section 5.5.

5.0 ISSUE RESOLUTION

DOE believes its existing nuclear safety regulatory framework is fully adequate to provide reasonable assurance of adequate protection of public and worker health and safety across the DOE defense nuclear complex. However, DOE believes that improvements can be made and has also developed an implementation plan that will meet the safety improvement objectives of the DNFSB's Recommendation 2020-1, as described in the Secretary's September 8, 2021, Final Decision.

To address concerns regarding DOE's aging infrastructure, DOE will perform a benchmarking review to identify best practices for aging infrastructure management (described in Section 5.1).

In the Secretary's Final Decision, DOE agreed to establish requirements for certain topics contained in the Recommendation. DOE believes that in many cases the best path to achieving that is through revisions to its directives and technical standards (described in Sections 5.2, 5.3, and 5.5). However, DOE also intends to perform a regulatory analysis to evaluate whether changes to 10 CFR Part 830 are appropriate (Section 5.6).

In updating DOE's requirements for the development of safety basis documents, DOE will also update its primary technical standard used for the review and approval of safety basis documents. Section 5.5 describes planned improvements to DOE-STD-1104-2016.

Additional information that could inform future changes to the regulatory framework may be provided by the results of an independent review (Section 5.4). The Office of Enterprise Assessments (EA), with participation from the relevant Program Offices, will perform an independent review of the current safety basis development processes to determine whether improvements could be made for future submittals. DOE will assess the results of the review as part of its determination of where specific improvements can be implemented (e.g., regulatory framework, program guidance, site-specific processes, etc.).

The following sections describe in detail DOE's plan for implementing improvements to its regulatory framework.

5.1 Adopt Best Practices for Aging Infrastructure Management at Defense Nuclear Facilities

DOE's nuclear safety regulatory framework has requirements in place to ensure facilities and safety structures, systems, and components (SSCs), both active and passive, perform their safety functions. The Department's response to the Final Recommendation and the December 17, 2019, response to the Draft Recommendation included an extensive discussion regarding DOE's expectations for the performance of safety SSCs within DOE's policy documents. At

the highest level, compliance with 10 CFR Part 830, including the requirement in 10 CFR § 830.204(b)(4) to "derive hazard controls necessary to…demonstrate the adequacy of these [hazard] controls to eliminate, limit, or mitigate identified hazards…", is required for all Hazard Category (HC) 1, 2, and 3 nuclear facilities, and applies to new and existing facilities.

National Nuclear Security Administration (NNSA), Office of Environmental Management (EM), and Office of Science (SC) have established processes to identify, prioritize, and plan safety-related infrastructure upgrades at defense nuclear facilities and have associated planning and budgeting processes to ensure the needs are prioritized to meet mission objectives. DOE will perform a benchmarking review of these processes that identify and address safety related infrastructure upgrades to ensure facilities and safety structures, systems, and components (SSCs), both active and passive, perform their safety functions.

Consistent with the Secretary's Final Decision, the benchmark review will identify process enhancements for assessing any degradation of safety-related infrastructure and identifying recommended maintenance, repair, upgrade and replacement. The benchmark will also examine NNSA's, EM's, and SC's processes for identifying, prioritizing, and planning safety-related infrastructure investments within the federal budgeting process, and approaches to evaluate how the ISM principle of balanced priorities is applied to addressing safety-related aging infrastructure needs and prioritization for defense nuclear facilities' SSCs. The benchmarking review will compare and identify best practices from each programs' aging infrastructure methods, funding strategies, and prioritization processes to identify long-term investment needs/plans, maintain/expand operations, and address the performance of infrastructure supporting safety functions. As part of the benchmarking review, the review team will consider concerns identified in the Board's Recommendation, subsequent information from the Board, and best practices for addressing those concerns. The review will also consider a recently published American National Standard (ANSI/ANS-3.14-2021), *Process for Infrastructure Aging Management and Life Extension of Nonreactor Nuclear Facilities*; DOE Order 430.1C *Real Property Asset Management*; and other sources to guide benchmark activities for NNSA, EM, and SC.

Following completion of the benchmarking review, the review team will produce a final report describing approaches, capturing common elements, and identifying best practices used within NNSA, EM, and SC processes. The report will highlight process enhancements and recommend adoption of best practices, as appropriate. The final report will go through the Departmental concurrence process so that the recommended adoption of best practices is issued by the Secretary, obtains concurrence from all relevant Program Offices, and is transmitted to other relevant offices such as the Office of the Chief Financial Officer (Milestone 5.1.3).

Each Program Office responsible for defense nuclear facilities will use the final report to initiate action and implement accepted process enhancements. Actions are expected to be initiated within three months of the issuance of the final report by the Secretary (Milestone 5.1.4).

Given the multiple government-wide priorities that are considered during the budgeting process, DOE recognizes that not all infrastructure proposals will be funded in any given budgeting cycle. DOE applies a risk-based budgeting prioritization approach, taking mitigating steps, as appropriate, to continue to maintain adequate safety.

Milestone 5.1.1 - Establish a Benchmarking Charter

Lead Responsible Organization: Office of Science with support from other relevant Program Offices.

Deliverable: Establish a Benchmark Charter that identifies the review team, process and approach documents, information sources, and review scope.

Expected Completion Date: 3 months after issuance of the Implementation Plan.

Milestone 5.1.2 - Perform Benchmark Review

Lead Responsible Organization: NNSA Associate Administrator for Safety, Infrastructure and Operations with support from other Program Offices.

Deliverable: Perform a broad-based benchmark review. Produce a final report describing approaches, capturing common elements, and identifying best practices and process enhancements.

Expected Completion Date: 15 months after issuance of the implementation plan.

Milestone 5.1.3 - Share Results across the Department

Lead Responsible Organization: Office of Environment, Health, Safety, and Security with support from all relevant Program Offices.

Deliverable: Compile and share benchmarking results through a final report that highlights process enhancements and recommends adoption of best practices. Final report issued by the Secretary with concurrence from relevant offices, as appropriate.

Expected Completion Date: 3 months after completion of the benchmarking review (Milestone 5.1.2).

Milestone 5.1.4 - Implement Best Practices and Process Enhancements Based on Results of Benchmarking Review

Lead Responsible Organization: Relevant Program Offices (as appropriate)

Deliverable: Begin implementation of accepted best practices and process enhancements developed in response to conclusions of the benchmark review.

Expected Completion Date: Beginning 3 months after issuance of report (Milestone 5.1.3).

5.2 Continue Improvement on an Effective Hazard Categorization Process for the Department

DOE has confidence that its existing framework for hazard categorization, using DOE-STD-1027-1992, Change Notice (CN) 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports;* DOE-STD-1027-2018, CN 1, *Hazard Categorization of DOE Nuclear Facilities*; and NA-SD-1027, CN 2, *Guidance on Using Release Fraction and Modern Dosimetric Information Consistently With DOE-STD-1027-92, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, Change Notice No.* 1 (for use for final hazard categorization), provides reasonable assurance of adequate analysis of radiological hazards in support of hazard categorization, and can continue to be used effectively to meet the requirements of 10 CFR Part 830. DOE will ensure that future activities related to DOE Standard 1027 align with DOE's acceptance of the recommendations provided by the Board (sub-recommendation 2).

DOE-STD-1027-2018 was developed in a manner that continues to provide hazard categorization that is "consistent with DOE-STD-1027-92," as required by 10 CFR § 830.202(b)(3). Although DOE-STD-1027-2018, allows the use of more accurate input into hazard categorizations, it maintains the same methodology provided in DOE-STD-1027-92, CN 1.

At a minimum, the Department will initiate a rulemaking in the *Federal Register* which will propose to formally incorporate the Department's hazard categorization Standard into the rule.

As part of future work regarding hazard categorization, DOE will first perform an analysis of regulatory options to evaluate proposed revisions to the Rule. The regulatory analysis will be developed by a team of nuclear safety subject matter experts (SMEs) led by the Office of Environment, Health, Safety, and Security and with participation from relevant Program Offices, and Office of General Counsel. During the development of the regulatory analysis, DOE will interact with the DNFSB and staff regularly, either through periodic briefings or collaborative discussions. The final product developed by DOE will be a technical paper that analyzes regulatory options regarding DOE hazard categorization and will recommend a path forward. The final report will go through the Departmental concurrence process so that the recommended path forward is issued by the Secretary and obtains concurrence from all relevant Program Offices (Milestone 5.2.1). (These activities will help achieve the objectives of sub-recommendation 2.a and 2.b).

Consistent with the Secretary's Final Decision, the regulatory analysis will:

- Consider options for a proposed new standard, including an evaluation of DOE-STD-1027-2018 to determine potential changes (including consideration of concerns identified in the Board's letter dated January 19, 2021), and the need for a revision of the Standard;
- Consider options for proposed revisions to 10 CFR Part 830 to incorporate the standard(s) used by the Department for hazard categorization;

- Evaluate the existing framework of hazard categorization and use of multiple versions, and options going forward for categorizing new and existing defense nuclear facilities; and
- Evaluate the nuclear safety framework (i.e., DOE directives and technical standards) to determine the best approach to proposing requirements that would provide greater confidence that defense nuclear facilities, including below hazard category 3 facilities, are appropriately categorized.

Within the regulatory analysis DOE will consider preferred options from the proposed courses of action. The benefits and drawbacks of the identified options will also be evaluated.

Regarding the rulemaking effort, the Department will follow the Administrative Procedure Act (APA) informal rulemaking process to develop and issue a Notice of Proposed Rulemaking (NOPR) (Milestone 5.2.4), collect and respond to public comment, and subsequently issue a Final Rule, if warranted. Interested stakeholders, including the Board, will have an opportunity to comment on the proposed rule, and have those comments considered by DOE as part of the rulemaking process. DOE will consult with the DNFSB and may share a copy of the draft NOPR prior to issuing it for public comment. DOE would initiate a Rulemaking which would propose to incorporate a version of DOE-STD-1027, in which case, the methodology for hazard categorization proposed for inclusion within 10 CFR Part 830 would be evaluated for public comment. Consistent with the Memorandum of Understanding (MOU) between DOE and the DNFSB, timely communication will be provided to the DNFSB regarding any plans for an update to 10 CFR Part 830. The DNFSB may provide feedback to DOE on its plans that DOE will consider as it proceeds with rulemaking

If supported by the analysis of regulatory options, DOE may initiate a revision to DOE-STD-1027-2018. If a revision is pursued, as part of the development of the Project Plan and Project Justification Statement (Milestone 5.2.2), DOE will develop clear expectations and objectives for hazard categorization methodologies at defense nuclear facilities. DOE will develop a Standard (Milestone 5.2.3) in accordance with DOE Order 252.1A, *Technical Standards Program*, using the Department's Review and Comments process (RevCom) (which includes review and comment from DOE SMEs and the DNFSB staff). Consistent with the MOU between DOE and the DNFSB, DOE expects the DNFSB staff will review the draft Standard and may provide comments to DOE via written correspondence or via the DOE RevCom process. During the development of the draft Standard, DOE will interact with the DNFSB staff regularly, either through periodic briefings or collaborative discussions

During the DNFSB staff's 2020 review of the content and technical basis of DOE-STD-1027-2018, CN 1, DOE and the Board staff held multiple meetings to discuss the Board staff's questions and concerns. The DNFSB staff's outstanding issues were identified in the Board's January 19, 2021, letter, which was provided to DOE for information. During the development of a draft Standard, DOE will work with the Board staff to further understand these concerns. (These activities will achieve the objectives of sub-recommendations 2.a and 2.b and DOE's acceptance.)

Upon the completion of Milestones 5.2.1-5.2.4, if a new hazard categorization methodology is issued, DOE may perform an evaluation of the use of previous methodologies, such as DOE-STD-1027-2018 and NNSA SD 1027, at existing defense nuclear facilities to ensure that defense nuclear facilities (including hazard category 3 and below hazard category 3 facilities) that are using these methodologies are appropriately categorized or whether the new or modified methodology should be considered. The necessity of this evaluation would be determined by the regulatory analysis which would establish DOE's approach moving forward for categorizing new and existing defense nuclear facilities. (This activity will achieve the objectives of sub-recommendations sub-recommendation 2.c).

Milestone 5.2.1 - **Analysis of Regulatory Options**

Lead Responsible Organization: Office of Environment, Health, Safety, and Security

Deliverable: Technical Report with concurrence from relevant Program Offices documenting the analysis of regulatory options regarding DOE hazard categorization.

Expected Completion Date: 6 months after issuance of IP

Milestone 5.2.2 - Development of STD-1027 Revision Project Scope and Project Justification Statement (based on the results of Milestone 5.2.1)

Lead Responsible Organization: Office of Environment, Health, Safety, and Security

Deliverable: Evaluation of project scope and development of an approved Project Justification Statement with concurrence from the Program Offices.

Expected Completion Date: 3 months after issuance of regulatory analysis (Milestone 5.2.1)

Milestone 5.2.3 - Development and Issuance of Revised DOE-STD-1027 (based on the results of Milestone 5.2.1)

Lead Responsible Organization: Office of Environment, Health, Safety, and Security

Interim Milestone: Draft Standard entered into RevCom.

Target Date: In accordance with approved Project Plan

Deliverable: Issuance of updated version of DOE-STD-1027

Expected Completion Date: 2 years following the issuance of the Project Justification Statement (Milestone 5.2.2)

Milestone 5.2.4 - Initiate Rulemaking

Lead Responsible Organization: Office of Environment, Health, Safety, and Security

Deliverable: Publish a NOPR in the *Federal Register*, which would propose to incorporate DOE-STD-1027 into 10 CFR 830

Expected Completion Date: Publish a NOPR 6 months following the issuance of revised DOE-STD-1027 (Milestone 5.2.3) or decision to not revise (Milestone 5.2.1)

Milestone 5.2.5 - Evaluation of Hazard Categorization (based on the results of Milestone 5.2.1)

Lead Responsible Organization: Office of Environment, Health, Safety, and Security.

Deliverable: Operating Experience (OE) document issued to evaluate the use of older versions of DOE-STD-1027 for the identified set of HC-3 defense nuclear facilities and below HC-3 defense nuclear facilities

Expected Completion Date: 6 months following the issuance of revised DOE-STD-1027 (Milestone 5.2.3)

5.3 Establish Requirements for Key Safety Basis Concepts (USQs, JCOs, TSRs, SACs)

DOE has evaluated the nuclear safety management framework to determine the best approach to establish requirements for three main topical areas:

- USQs and JCOs (sub-recommendation 5.a);
- TSRs (sub-recommendation 5.b); and
- SACs (sub-recommendation 5.c).

DOE has determined that new requirements at the Order level are appropriate for each of these safety basis topical areas to enhance the nuclear safety framework and will address the objectives of sub-recommendations 5.a., 5.b., and 5.c. An Order with a Contractor Requirements Document containing safety basis requirements could then be added to DOE contracts to make the requirements applicable to DOE HC 1, 2, and 3 nuclear facilities.

DOE has assessed that the approach to establish new safety basis requirements applicable to HC 1, 2, and 3 nuclear facilities could include the development of a new Nuclear Safety Order and a revision of DOE O 420.1C, *Facility Safety*. Creating an Order with focused requirements for nuclear safety basis would provide an opportunity to separate out the nuclear safety requirements from those requirements within DOE O 420.1C that are applicable to all facilities. As a result, the revision to DOE O 420.1C and the separation of requirements could ultimately result in two orders: a new Nuclear Safety Order and the revised Facility Safety Order. The details of the contents of any future orders would be determined by the Directives process via the IPT.

The intent of the Nuclear Safety Order[1] would be to consolidate any existing safety basis requirements that are currently embedded in separate directives and standards, such as in DOE O 420.1C, with new nuclear safety basis requirements, as described in this IP. The intent would not be to rewrite existing requirements contained in DOE O 420.1C, but rather, to retain these requirements and develop new safety basis requirements as committed to in the Secretary's Final Decision. The Order will create new requirements that cover the topics of USQs, JCOs, TSRs, and SACs to address the Board's concerns outlined in Recommendation 2020-1. The development of the Nuclear Safety Order would also address the following safety basis functional areas:

[1] The term Nuclear Safety Order is used in this IP to refer to the new Order. The name of the Order, the applicability, and the final scope will be further developed by the IPT.

- The evaluation of the newly revised DOE G 424.1-1C, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*, to consider what expectations should be elevated to create new requirements in the Order. As part of this effort, DOE will also consider the Board's July 10, 2020, letter.
- The evaluation of DOE G 423.1-1B, *Implementation Guide for Use in Developing Technical Safety Requirements*, to consider what expectations should be elevated to create new requirements in the Order to support the federal regulation. As part of this effort, DOE will consider issues discussed in DNFSB Technical Report 45, *Violations of the Nuclear Safety Basis.*
- The evaluation of DOE-STD-1186-2016, *Specific Administrative Controls,* and whether the requirements should be elevated to requirements in an Order, or whether the Standard should be invoked in the future.

The Nuclear Safety Order will be developed consistent with the process described in DOE O 251.1D, Chg 1, *Departmental Directives Program,* utilizing the Integrated Project Team (IPT) approach. The IPT will clarify the separation between the new Orders, the applicability and scope of each. In addition, as part of the review and comment process, the RevCom system will be used to gather comments from SMEs in the complex. Prior to entering RevCom, the draft Order will be reviewed by the Chiefs of Nuclear Safety/Chief of Defense Nuclear Safety to ensure it appropriately addresses the objectives of this Implementation Plan. Consistent with the MOU between DOE and the DNFSB, DOE expects the DNFSB will review the new Order and may provide comments to DOE via written correspondence or via the DOE RevCom process. During the development of draft Order, DOE will interact with the DNFSB staff regularly, either through periodic briefings or collaborative discussions.

Following the completion and issuance of the Nuclear Safety Order, DOE will have created requirements that satisfy the objectives of sub-recommendations 5.a, 5.b, and 5c. and DOE's acceptance.

Key milestones are captured in the IP actions below.

DOE anticipates that the development of the Nuclear Safety Order will necessitate changes in DOE's regulatory framework, however, these changes will take place outside of this IP. Additional work includes:

- Revisions of the USQ and TSR Guides to align guidance with new requirements;
- Concurrent development of a revised Facility Safety Order;
- Revision of other directives/standards to align with new requirements (e.g., DOE O 413.3B and DOE-STD-1189); and
- Potentially adopting safety basis-related requirements that are outside the scope of this Recommendation.

Milestone 5.3.1 - New Nuclear Safety Order Authorization by Directives Review Board (DRB)

Lead Responsible Organization: Office of Environment, Health, Safety, and Security

Deliverable: Evaluation of project scope and development of Decision Memorandum with approval by the DRB

Expected Completion Date: 6 months after issuance of IP

Milestone 5.3.2 - Development and Issuance of New Nuclear Safety Order

Lead Responsible Organization: Office of Environment, Health, Safety, and Security

Interim Milestone: Draft Order into RevCom

Target Date: In accordance with approved Project Plan

Deliverable: Issuance of Nuclear Safety Order

Expected Completion Date: 2 years following project authorization (Milestone 5.3.1)

5.4 Conduct an Independent Review of the Safety Basis Development Process

DOE will conduct an independent review of the current safety basis development processes at defense nuclear facilities to determine whether improvements can be made for future submittals. This review will focus on both the contractor activities to develop safety basis documents and the DOE activities to review and approve safety basis changes in a timely manner. This review, which will be led by the DOE Office of Enterprise Assessments (EA) with participation from Program Office SMEs, will be conducted in two phases over the course of approximately 18 months. These activities will help achieve the objectives of sub-Recommendation 4.a. and DOE's acceptance.

The first phase will involve conducting a survey of defense nuclear facilities to collect and analyze information associated with parameters of safety basis development processes of the various contractor organizations, as well as processes by the cognizant approval organizations. Based on this analysis, six to eight sites will be selected for follow-up to obtain additional, detailed information to allow evaluation of the processes and recommendations for improvement. This evaluation is not intended to be a requirements-based compliance review, but rather, a benchmarking process review to discover those obstacles in the processes that prevent timely development and approval of high-quality safety basis documents. This review will be conducted in accordance with an approved review plan. The second phase will be a final report documenting the results of the review and providing recommendations. This report will be transmitted to EHSS-1 and the relevant Program Secretarial Officers (PSOs) for action as determined by the recipients.

During the development of the review plan and final report, DOE will keep the DNFSB informed on the content. Additionally, EA will brief the DNFSB or DNFSB staff, as requested, on the outcome of the review.

Issues identified in the recommendations will be evaluated and those recommendations accepted for action will be implemented by the appropriate office/site, as necessary. Actions are expected to be initiated within six months of the issuance of the final report by either the Office of Environment, Health, Safety, and Security, and/or Program Offices, depending on the final recommendations provided in the report.

Milestone 5.4.1 - Development and Issuance of a Review Plan

Lead Responsible Organization: Office of Enterprise Assessments

Deliverable: Review Plan detailing the review scope for an independent review of the safety basis development, review, and approval process

Expected Completion Date: 3 months after issuance of IP

Milestone 5.4.2 - Perform an independent review of the submittal and approval of safety documents

Lead Responsible Organization: Office of Enterprise Assessments

Deliverable: Report documenting the results of the review and providing recommendations. Transmit to EHSS-1 and PSOs for action

Expected Completion Date: 18 months after issuance of IP

Milestone 5.4.3 - Initiate action based on independent review recommendations (Based on the results of Milestone 5.4.2)

Lead Responsible Organization: Office of Office of Environment, Health, Safety, and Security, and/or Program Offices (as appropriate)

Deliverable: Initiate action in response to the results and accepted recommendations of the independent review report

Expected Completion Date: 6 months after issuance of report in Milestone 5.4.2

5.5 Evaluate and Update of Safety Basis Document Review Requirements

DOE will evaluate DOE-STD-1104-2016, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents,* the primary document that provides requirements and guidance for preparation of Safety Evaluation Reports (SERs) and safety review letters for DOE nuclear facilities. DOE will evaluate the Standard to incorporate DOE's expectations for the review and approval of the following documents:

- Facility safety bases (sub-recommendation 3.a); and,
- JCOs; and ESSs (sub-recommendation 3.b).

DOE anticipates that to incorporate requirements that will meet the objectives of Sub-recommendations 3.a and 3.b, two major revisions to DOE-STD-1104-2016 will be

necessary. While DOE anticipates completing two separate revisions, the milestones in this IP refer to the second and final revision of DOE-STD-1104.

The scope of the ongoing first revision, is to revise DOE-STD-1104-2016 to incorporate DOE's expectations for the review of facility safety bases to ensure they meet the requirements of 10 CFR Part 830 as issued in October 2020, and as committed to in the Secretary's Final Decision. This revision, which was initiated in response to the October 2020 Final Rule, will add guidance regarding DSA annual submittals and for review of proposed safety basis changes. Work has been initiated on this as described in Section 4.0.

The scope of the second revision will be to revise DOE-STD-1104 to establish clear requirements for DOE approval of JCOs and ESSs for PISAs that result in positive USQ determinations. The timing of the second revision would need to occur after requirements have been established for USQs and JCOs in the new Nuclear Safety Order as part of the commitments described in Section 5.3, above.

During the development of the revised Standard, as part of the review and comment process, the RevCom system will be used to gather comments from SMEs in DOE's nuclear facilities complex. Consistent with the MOU between DOE and the DNFSB, DOE expects the DNFSB will review the draft Standard and may provide comments to DOE via written correspondence or via the DOE RevCom process. DOE will interact with the DNFSB staff regularly, either through periodic briefings or collaborative discussions, throughout the development of the revised Standard.

DOE-STD-1104-2016 is currently invoked in DOE O 420.1C, *Facility Safety*. An update to DOE O 420.1C would be necessary to update the reference to DOE-STD-1104 to the latest version.

Milestone 5.5.1 - Development of DOE-STD-1104 Revision Project Scope and Project Justification Statement

Lead Responsible Organization: Office of Environment, Health, Safety, and Security

Deliverable: Approved Project Justification Statement with concurrence from the relevant Program Offices (or revised Project Justification Statement, if two revisions are combined)

Expected Completion Date: 1 year following the issuance of the IP

Milestone 5.5.2 - Final Revision to DOE-STD-1104

Lead Responsible Organization: Office of Environment, Health, Safety, and Security

Interim Milestone: Draft Standard into RevCom.

Target Date: In accordance with approved Project Plan Justification Statement

Deliverable: Issuance of revised DOE-STD-1104

Expected Completion Date: 2.5 years following issuance of IP (In parallel with the issuance of new Nuclear Safety Basis Order in Milestone 5.3.2)

5.6 Evaluate DOE's Regulatory Framework for Ensuring Appropriate Implementation of Safety Basis Concepts

As a final step to DOE's evaluation of the current regulatory framework, DOE will perform a regulatory analysis to evaluate whether another rulemaking should be initiated. Sections 5.2-5.5 of this IP describe a plan for updates to requirements within some of DOE's nuclear safety related directives and technical standards. This regulatory analysis will evaluate whether changes to the DOE's nuclear safety regulation are also necessary. Specifically, the regulatory analysis will evaluate whether:

- existing requirements in 10 CFR Part 830 in conjunction with recently updated DOE Directives and Technical Standards are adequate;
- certain safety basis concepts should be elevated and new requirements proposed to be included in 10 CFR Part 830; and
- any changes to 10 CFR Part 830 should be proposed through an additional rulemaking process.

Topics to be considered include those discussed as part of the Recommendation, including whether to establish additional requirements, definitions, clarifications, or discussion regarding:

- Requirements necessary for review of facility safety bases, and review and approval of JCOs/ESSs (Sub-recommendation 3.c);
- Requirements for USQs, JCOs, TSRs, SACs (sub-recommendation 5.d); and
- Requirements for Defense in Depth (sub-recommendation 5.e).

The regulatory analysis will be conducted by a team of nuclear safety SMEs led by the Office of Environment, Health, Safety, and Security with participation from relevant Program Offices, and the Office of General Counsel. The final product developed by DOE will be a technical paper that analyzes the options, including whether changes should be proposed through an additional rulemaking to 10 CFR Part 830, or if requirements exist within DOE's broader nuclear safety framework are sufficient. Further, the technical paper will recommend a path forward.

During the development of the regulatory analysis, DOE will interact with the DNFSB and staff regularly, either through periodic briefings or collaborative discussions. Consistent with the MOU between DOE and the DNFSB, timely communication will be provided to the DNFSB regarding any plans for an update to 10 CFR Part 830. The DNFSB may provide feedback to DOE on its plans that DOE will consider as it proceeds with rulemaking.

The final report will go through the Departmental concurrence process so that the recommended path forward (such as a decision on whether to initiate rulemaking) is issued by the Secretary and obtains concurrence from all relevant Program Offices and by senior leadership. If a decision is made to initiate rulemaking the Department would follow the rulemaking process to develop and issue a NOPR, collect and respond to public comment, and subsequently issue a Final Rule if warranted.

Rulemaking activities would occur outside of the commitments in this IP.

Milestone 5.6.1 Analysis of Regulatory Options

Lead Responsible Organization: Office of Environment, Health, Safety, and Security

Deliverable: Technical Paper with concurrence from relevant Program Offices documenting the analysis of regulatory options

Expected Completion Date: 1 year following the issuance of new DOE Nuclear Safety Order (Milestone 5.3.2)

6.0 SUMMARY

The Department believes that these actions are appropriate and sufficient for implementing the comprehensive intent of DNFSB Recommendation 2020-1 and in fulfilling the actions described in the Secretary's September 8, 2021, Final Decision. The actions described in this IP will achieve the overall objective of ensuring the adequacy and continued effectiveness of DOE's nuclear safety regulatory framework at DOE defense nuclear facilities.

A summary of the milestones and deliverables is included in Table 1 and an overview of the expected schedule is provided in Figure 1. An overview of DOE's response to Sub-Recommendations 2 through 5, and the impact on the nuclear safety framework is provided in Figure 2.

7.0 ORGANIZATION AND MANAGEMENT

Overall execution of this IP is the responsibility of the Director of the Office of Nuclear Safety within the Office of Environment, Health, Safety, and Security, who is assigned as Responsible Manager. Implementation of this plan will also involve representatives from the Offices of Environmental Management, Nuclear Energy, and Science; the National Nuclear Security Administration; and the Office of Enterprise Assessments. Representatives from all these offices will support development of the technical products committed to in the Plan. Responsibility for implementation of the changes in requirements created in response to this Plan will reside with the relevant Program Offices.

Consistent with DOE's processes and the MOU, DOE will engage the DNFSB staff during the development of the products and deliverables identified in this Implementation Plan to allow for DNFSB staff understanding of approaches taken to address the recommendation. In addition, to ensure the various Department implementing elements and the Board remain informed of the status of Plan implementation, the Department will provide periodic briefings, as requested.

Table 1 - Summary of Milestones and Deliverables

No.	Milestone	Deliverable	Anticipated Completion Date
5.1.1	Establish a Benchmarking Charter	Establish a Benchmark Charter that identifies the review team, process and approach documents, information sources, and review scope	3 months after issuance of the implementation plan (September 1, 2022)
5.1.2	Perform Benchmark Review	Perform a broad-based benchmark review of processes for assessing degradation of safety-related infrastructure and identifying recommended maintenance, repair, upgrade and replacement. The benchmark will also examine NNSA's, EM's, and SC's planning and budgeting processes and approaches to evaluate how the ISM principle of balanced priorities is applied to, addressing safety related aging infrastructure needs and prioritization for defense nuclear facilities' SSCs. Produce a final report describing approaches, capturing common elements, and identifying best practices and process enhancements.	15 months after issuance of the implementation plan (September 1, 2023)
5.1.3	Share Results across the Department	Compile and share benchmarking results through a final report that highlights process enhancements and recommends adoption of best practices. Final report issued by the Secretary with concurrence from relevant offices, as appropriate.	3 months after completion of the benchmarking review (Milestone 5.1.2) (December 1, 2023)
5.1.4	Implement Best Practices and Process Enhancements Based on Results of Benchmarking Review	Begin implementation of accepted best practices and process enhancements developed in response to conclusions of the benchmark review.	Beginning 3 months after issuance of report (Milestone 5.1.3). (March 1, 2024)
5.2.1	Analysis of Regulatory Options	Technical Report with concurrence from relevant Program Offices documenting	6 months after issuance of IP (December 1, 2022)

		the analysis of regulatory options regarding DOE hazard categorization	
5.2.2	Development of STD-1027 Revision Project Scope and Project Justification Statement (based on the results of Milestone 5.2.1)	Evaluation of project scope and development of an approved Project Justification Statement with concurrence from the Program Offices	3 months after issuance of regulatory analysis (March 1, 2023)
5.2.3	Development and Issuance of Revised DOE-STD-1027 (based on the results of Milestone 5.2.1)	Issuance of updated version of DOE-STD-1027	2 years following the issuance of the Project Justification Statement (March 1, 2025)
5.2.4	Initiate Rulemaking	Publish a NOPR in the *Federal Register*, which would propose to incorporate DOE-STD-1027 into 10 CFR 830	Publish the NOPR 6 months following the issuance of DOE-STD-1027 (Milestone 5.2.3) or decision to not revise (Milestone 5.2.1) (no later than September 1, 2025)
5.2.5	Evaluation of Categorization Effectiveness (based on the results of Milestone 5.2.1)	Operating Experience (OE) document issued to consider the use of older versions of DOE-STD-1027 for the identified set of HC-3 defense nuclear facilities and below HC-3 defense nuclear facilities	6 months following the issuance of revised DOE-STD-1027 (September 1, 2025)
5.3.1	New Nuclear Safety Order Authorization by Directives Review Board (DRB)	Evaluation of project scope and development of Decision Memorandum with approval by the DRB	6 months after issuance of IP (December 1, 2022)
5.3.2	Development and Issuance of New Nuclear Safety Order	Issuance of Nuclear Safety Order	2 years following project authorization (December 1, 2024)
5.4.1	Development and Issuance of a Review Plan	Review Plan detailing the review scope for an independent review of the safety basis development, review, and approval process	3 months after issuance of IP (September 1, 2022)
5.4.2	Perform an independent review of the submittal and approval of safety documents	Report documenting the results of the review and providing recommendations. Transmit to EHSS-1 and PSOs for action	18 months after issuance of IP (December 1, 2023)
5.4.3	Initiate action based on independent review recommendations	Initiate action in response to the results and accepted	6 months following issuance of report in

	(Based on the results of Milestone 5.4.2)	recommendations of the independent review report	Milestone 5.4.2 (June 1, 2024)
5.5.1	Development of DOE-STD-1104 Revision Project Scope and Project Justification Plan	Approved Project Justification Statement with concurrence from the relevant Program Offices (or revised Project Justification Statement, if two revisions are combined)	1 year following the issuance of the IP (June 1, 2023)
5.5.2	Final Revision to DOE-STD-1104	Issuance of revised DOE-STD-1104	2.5 years following issuance of IP (In parallel with the issuance of new Nuclear Safety Basis Order in Milestone 5.3.2). (December 1, 2024)
5.6.1	Analysis of Regulatory Options	Technical Paper with concurrence from relevant Program Offices documenting the analysis of regulatory options	1 year following the issuance of new DOE Nuclear Safety Order (December 1, 2025)

*Projected completion dates are an estimation and assume an June 1, 2022 transmittal of the IP.

Figure 1. Overview of Deliverable Schedule

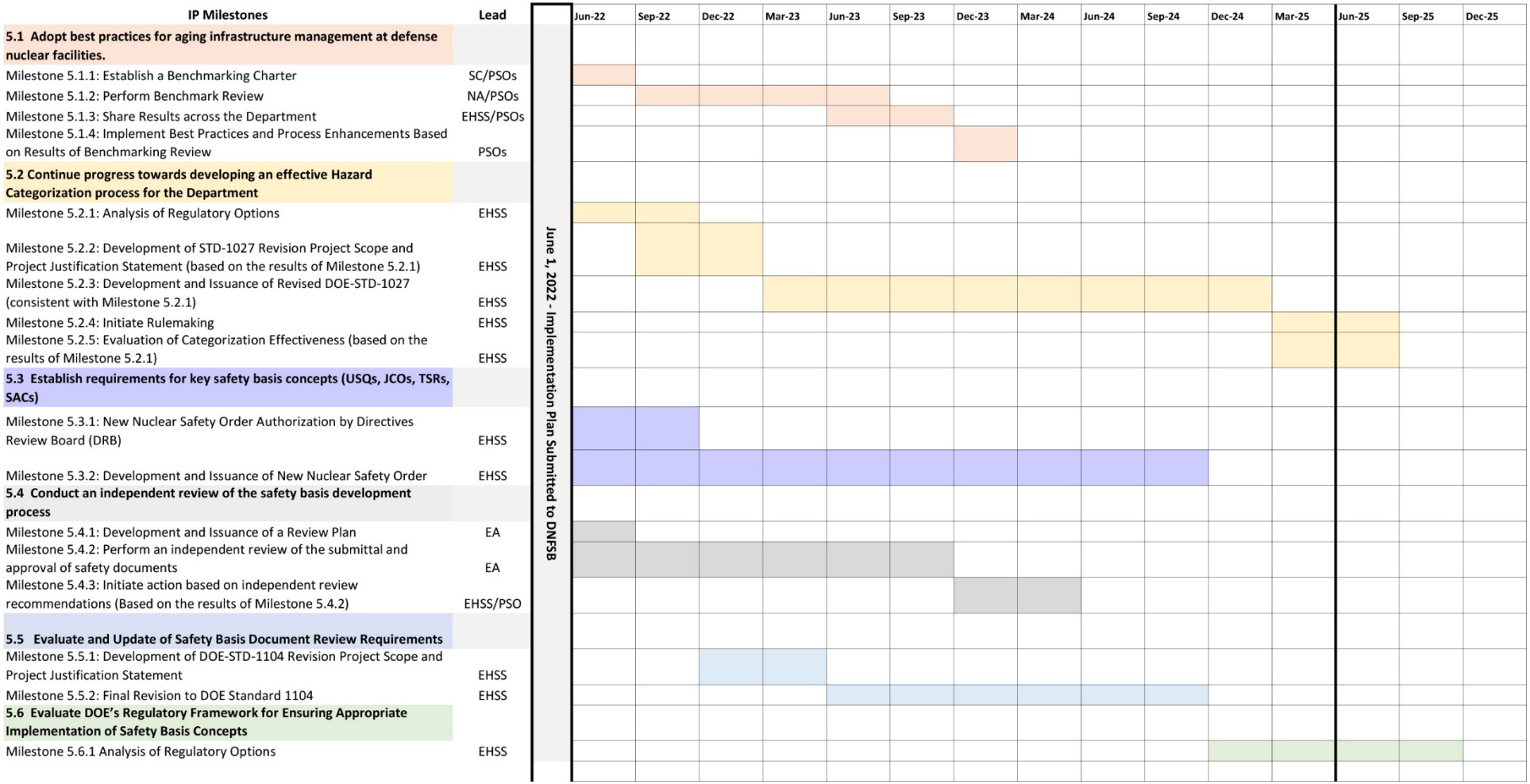

Figure 2: Overview DOE Response to Sub-Recommendations 2-5