



RECOMMENDATION 2020-1, *NUCLEAR SAFETY* *REQUIREMENTS*, REAFFIRMATION

EFCOG Workshop Presentation

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Outline

- Summary
- Sub-recommendations
 - Aging infrastructure
 - Hazard categories
 - DOE approvals
 - Evaluation of DSA Preparation and Review Processes
 - Safety Basis Requirements
- Q&A



Summary

- The Board reaffirmed Recommendation 2020-1 on June 1, 2021.
- The Secretary issued her final decision on September 8, 2021.
- Reaffirmation makes updates to sub-recommendations and supporting text.



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.*
- A strong regulatory framework is needed to ensure the continued functionality and reliability of the aging infrastructure that supports the safety of defense nuclear facilities until it can be replaced or taken out of service.



1. Aging Infrastructure (cont.)

- Maintenance of safety bases for compliance with 10 CFR 830
 - Reliability?
 - Refurbishment / replacement?
 - Backfit?
 - Support systems and infrastructure?
- Y-12 Extended Life Program example
 - Board letter and staff report, May 11, 2017



2. Hazard Categories

- a) *Revise DOE Standard 1027-2018 to address the deficiencies noted in the Board's letter dated January 19, 2021.*
 - 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 they are appropriately categorized.*
- Deficiencies and inconsistencies amongst the standards could lead to inappropriate hazard categorization, inadequate safety analyses, and identification of inadequate controls for the protection of workers and members or the public.



2. Hazard Categories (cont.)

- Board letter and staff report, January 19, 2021
 - Bounding lung absorption type
 - Organ vs. whole body dose to derive TQ values
 - Opportunities to improve clarity
- Use of single version
- Review of existing hazard category 3 and below



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 JCOs and ESSs for PISAs that result in a positive USQ determination.*
 - c) *Update 10 CFR 830 to incorporate the requirements established per items 3.a and 3.b.*
- Without a required periodic review and approval, DOE may miss opportunities to identify negative effects of minor changes over time, latent defects in supporting analyses, or other DSA quality issues.



3. DOE Approvals (cont.)

- Effects of minor changes over time
- Discovery of latent errors or quality issues
- ESSs and JCOs



4. Evaluation of 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.*
- It is important that DOE fully understand any issues contributing to ineffective DSA preparation and review to ensure that DOE-approved safety bases continue to provide adequate protection of the public.



4. Evaluation of DSA Preparation and Review Processes (cont.)

- Implementation challenges
- Review iterations
- Complex facilities



5. Safety Basis 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 letter dated July 10, 2020.*
- b) *Establish clear requirements for 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 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.*



5. Safety Basis Requirements (cont.)

- Lack of implementation requirements leads to inconsistent safety basis implementation across the complex. DOE should incorporate specific implementation requirements for USQs, TSRs, and SACs in its regulatory framework, including 10 CFR 830.



5. Safety Basis Requirements (cont.)

- Board letter and staff report, July 10, 2020, on implementation of the PISA process
 - Timeliness of new information process and PISA process
 - Pre-new information durations
- Board letter and TECH-45, *Violations of the Nuclear Safety Basis*, August 7, 2020
 - Completion times and time of declaration; ConOps and administrative compliance; surveillance requirements; SACs; USQs; additional topics
 - DNFSB staff presentation to EFCOG in February 2021



Questions?



Acronyms and References

Acronyms

- CFR – Code of Federal Regulations
- ConOps – Conduct of Operations
- DOE – Department of Energy
- DSA – Documented Safety Analysis
- JCO – Justification for Continued Operation
- NNSA – National Nuclear Security Administration
- PISA – Potential Inadequacy of the Safety Analysis
- SAC – Specific Administrative Control
- SD – Supplemental Directive
- USQ – Unreviewed Safety Question
- USQD – Unreviewed Safety Question Determination

References

- Title 10, Code of Federal Regulations, Part 830, *Nuclear Safety Management*
- DOE Guide 423.1-1, *Implementation Guide for Use in Developing Technical Safety Requirements*
- DOE Guide 424.1-1, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*
- DOE Standard 1028-2018, *Hazard Categorization of DOE Nuclear Facilities*
- DOE Standard 1104, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*
- DOE Standard 1186, *Specific Administrative Controls*
- NNSA SD 1027, *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*
- Board letter transmitting TECH-45, *Violations of the Nuclear Safety Basis*, August 6, 2020
- Board letter transmitting its review of the PISA process, July 10, 2020
- Board letter transmitting its review of the Y-12 Extended Life Program, May 11, 2017