

**NOTATION VOTE**

**RESPONSE SHEET**

**TO:** Annette Vietti-Cook, Secretary  
**FROM:** Commissioner Burns  
**SUBJECT:** SECY-18-0055: Proposed Rule: Regulatory Improvements for Production and Utilization Facilities Transitioning to Decommissioning (RIN 3150-AJ59)

Approved  Disapproved  Abstain  Not Participating


COMMENTS: Below  Attached  None

I approve publication of the proposed rule in the *Federal Register*, subject to the comments below and the attached edits. I commend the staff for their very comprehensive and thoughtful approach to meeting the Commission's direction from the Staff Requirements Memorandum (SRM) associated with SECY-14-0118, "Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements." This rulemaking will go a long way towards improving the effectiveness and efficiency of the regulatory process for plants transitioning to decommissioning, while maintaining a level of safety and security that is commensurate with the with the risk profile of such facilities. I also approve closing the tasking for WITS 201100252/NMSS2014413.

There is one aspect of the staff's proposal that I do not approve, namely, the proposal to amend the Backfit Rule to insert text explaining that, in the case of a compliance backfit, a documented evaluation must include a consideration of the costs of imposing the backfit. The staff states that the Commission provided direction to make this change in the SRM for COMSECY-16-0020, "Revision of Guidance Concerning Consideration of Cost and Applicability of Compliance Exception to Backfit Rule." However, in that SRM, the Commission only approved OGC's recommendation to revise agency *guidance* concerning consideration of cost and application of the Backfit Rule and did not approve amendment of the rule itself.

**Entered in STARS**

Yes   
No

  
\_\_\_\_\_  
Signature  
26 April 2019  
\_\_\_\_\_  
Date

**NUCLEAR REGULATORY COMMISSION**  
**10 CFR Parts 20, 26, 50, 51, 52, 72, 73, 140**

**[NRC-2015-0070]**

**RIN 3150-AJ59**

**Regulatory Improvements for Production and Utilization Facilities Transitioning to  
Decommissioning**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Proposed rule.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC) is proposing to amend its regulations that relate to the decommissioning of production and utilization facilities. The NRC's goals in amending these regulations are to provide for a safe, effective, and efficient decommissioning process; reduce the need for license amendment requests and exemptions from existing regulations; address other decommissioning issues deemed relevant by the NRC; and support the principles of good regulation, including openness, clarity, and reliability. The NRC will hold a public meeting to promote full understanding of this proposed rule and to facilitate public comments.

**DATES:** Submit comments by **[INSERT DATE 75 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Comments received after this date will be considered if it is practical to do so, but the Commission is able to ensure consideration only for comments received before this date.

**ADDRESSES:** You may submit comments by the following method:

- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID NRC-2015-0070. Address questions about NRC dockets to Carol Gallagher; telephone: 301-415-3463; e-mail: [Carol.Gallagher@nrc.gov](mailto:Carol.Gallagher@nrc.gov). For technical questions contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

For additional direction on obtaining information and submitting comments, see “Obtaining Information and Submitting Comments” in the SUPPLEMENTARY INFORMATION section of this document.

**FOR FURTHER INFORMATION CONTACT:** Alysia G. Bone, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-1034; e-mail: [Alysia.Bone@nrc.gov](mailto:Alysia.Bone@nrc.gov).

**SUPPLEMENTARY INFORMATION:**

**EXECUTIVE SUMMARY:**

A. Need for the Regulatory Action

The NRC is proposing to amend its regulations related to the decommissioning of production and utilization facilities, although most of the issues considered by the NRC would apply to nuclear power reactors. The Commission directed the NRC staff to proceed with an integrated rulemaking on power reactor decommissioning to address: a graded approach to emergency preparedness (EP), lessons learned from the licensees that have already gone through (or are currently going through) the decommissioning process, the advisability of requiring a licensee's post-shutdown decommissioning

activities report (PSDAR) to be approved by the NRC, the appropriateness of maintaining the three existing options for decommissioning and the timeframes associated with those options, the appropriate role of State and local governments and non-governmental stakeholders in the decommissioning process, and any other issues deemed relevant by the NRC staff.

Compared to an operating power reactor, the risk of an offsite radiological release is significantly lower, and the types of possible accidents are significantly fewer, at a nuclear power reactor that has permanently ceased operations and removed fuel from the reactor vessel. As a direct result, for the regulatory areas addressed in this rulemaking, there is no need for the NRC to impose new requirements to address identified safety or security concerns. Instead, the requirements in decommissioning should be aligned with the reduction in risk that occurs over time, while maintaining safety and security. The decommissioning process can be improved and made more efficient, open, and predictable by reducing the reliance on licensing actions (i.e., license amendment and exemption requests) to achieve a sustainable regulatory framework during decommissioning.

Other areas where the NRC has determined that changes to the regulations are appropriate include drug and alcohol testing; cyber security; and foreign ownership, control, or domination of a production or utilization facility.

In several areas of the current regulations, there is no means to distinguish provisions that apply to a power reactor that has permanently ceased operations from provisions that apply to an operating power reactor. To address this potential confusion, the NRC is proposing to amend its regulations in several areas to provide a regulatory framework for the transition to decommissioning. In this proposed rule, the NRC is recommending a graded approach that is commensurate with the reduction in

radiological risk at four levels of decommissioning: (1) permanent cessation of operations and permanent removal of all fuel from the reactor vessel, (2) sufficient decay of fuel in the spent fuel pool (SFP) such that it would not reach ignition temperature within 10 hours under adiabatic heatup conditions (i.e., a complete loss of SFP water inventory with no heat loss), (3) transfer of all fuel to dry storage, and (4) removal of all fuel from the site. The graded approach is a fundamental concept for this proposed rule.

Because the current regulatory framework for decommissioning is adequate to protect public health and safety and the common defense and security, many of the new requirements in this proposed rule are alternatives to current requirements.

## B. Major Provisions

Major provisions of this proposed rule include changes in the following areas:

- *Emergency preparedness.* This proposed rule offers an alternative, graded approach to the current requirements for onsite and offsite radiological emergency preparedness at a nuclear power reactor. This approach would provide four levels of emergency planning standards that coincide with significant milestones in decommissioning that reflect the gradual reduction of the radiological risk during decommissioning.

- *Physical security.* This proposed rule would make certain changes that would apply once a nuclear power reactor enters decommissioning. These proposed changes would (1) permit a certified fuel handler (CFH) to approve the temporary suspension of security measures during certain emergency conditions or during severe weather, (2) relieve licensees from the requirement that the physical protection program be designed to prevent significant core damage, (3) remove the requirement that a licensee must designate the reactor control room as a “vital area,” and (4) replace the

requirement for maintaining continuous communications between the alarm stations and the control room with a requirement for maintaining communications between alarm stations and the CFH or senior on shift licensee representative, or both. This last change would clarify the management role of the CFH in a manner that is consistent with § 50.54(y) of title 10 of the *Code of Federal Regulations* (10 CFR). The NRC is also proposing to add definitions for “change” and “decrease in safeguards effectiveness,” as those terms apply to the process for making changes to the security plans of licensees under 10 CFR part 50, “Domestic Licensing of Production and Utilization Facilities,” and 10 CFR part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” with operating, decommissioning, or decommissioned reactor units. In addition, this proposed rule would provide an option for a licensee to protect a general license independent spent fuel storage installation (ISFSI) under the physical security requirements in § 73.51, “Requirements for the physical protection of stored spent nuclear fuel and high-level radioactive waste,” instead of the physical security requirements in § 73.55, “Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage,” once all spent fuel has been moved to dry storage.

- *Cyber security.* This proposed rule would provide that the cyber security requirements in § 73.54, “Protection of digital computer and communication systems and networks,” continue to apply to a nuclear power reactor after the licensee’s permanent cessation of operations, until the fuel in the SFP has decayed such that it would not reach ignition temperature within 10 hours under adiabatic heatup conditions. This proposed rule would also provide for the removal of the cyber security license condition for 10 CFR part 50 power reactor licensees after the spent fuel decay period.

- *Drug and alcohol testing.* This proposed rule would correct inconsistencies in the NRC's regulations for fitness-for-duty (FFD) programs and clarify provisions regarding a nuclear power reactor licensee's insider mitigation program (IMP).

- *Certified fuel handler definition and elimination of the shift technical advisor.* This proposed rule would retain the existing definition for "certified fuel handler" and add an alternative that would eliminate the need for nuclear power reactor licensees to seek the Commission's approval of a fuel handler training program. The proposed provision would require the training program to address the safe conduct of decommissioning activities, safe handling and storage of spent fuel, and appropriate response to plant emergencies. The proposed alternative specifies that a CFH must be qualified in accordance with a fuel handler training program that meets the same requirements as training programs for non-licensed operators required by § 50.120, "Training and qualification of nuclear power plant personnel." This proposed rule would also clarify that a Shift Technical Advisor (STA) is not required for decommissioning reactors.

- *Decommissioning funding assurance.* This proposed rule recommends several changes in the area of decommissioning funding for nuclear power reactors. It would allow licensees to use the decommissioning funds collected and kept in an external trust under § 50.75, "Reporting and recordkeeping for decommissioning planning," during decommissioning for spent fuel management and for decommissioning of specific license ISFSIs, if certain conditions are met. It also would modify the reporting frequency in § 50.75 to be consistent with the decommissioning funding assurance reporting frequency for ISFSIs in § 72.30(c). For ISFSI funding reports, this proposed rule would modify the submittal dates to align with those in § 50.75 and remove the requirement for NRC approval of ISFSI reports filed under § 72.30(c). It also would clarify that although the regulations establish a continuing obligation to provide

reasonable assurance of decommissioning funding, when a licensee identifies a shortfall in the report required by § 50.75(f)(1), the licensee must obtain additional financial assurance to cover the shortfall and discuss that information in the next report. In addition, this proposed rule would make administrative changes to ensure consistency with § 50.4, "Written communications," regarding the submission of notifications and to eliminate § 50.75(f)(2) because § 50.75(f)(1) fully encompasses paragraph (f)(2). Besides proposing conforming changes to 10 CFR part 52, the NRC is asking whether the NRC should maintain identical requirements in § 52.110 and § 50.82.

- *Offsite and onsite financial protection requirements and indemnity agreements.* This proposed rule would allow certain power reactor licensees in decommissioning to reduce the insurance amounts that they are required to maintain without obtaining exemptions from the NRC's regulations. The NRC is interested in obtaining public input on this topic and is posing questions on specific license ISFSIs and adjustments for inflation.
- *Environmental considerations.* This proposed rule would clarify, but not impose new requirements, that licensees must evaluate the environmental impacts of decommissioning, and whether they are bounded by previous environmental reviews, in the PSDAR. The proposed rule would also clarify environmental reporting requirements.
- *Record retention requirements.* This proposed rule would remove certain record retention requirements for structures, systems, and components (SSCs) that no longer remain in service during decommissioning and would remove requirements to keep multiple copies of certain spent fuel storage records. The NRC is also asking a specific question concerning the recordkeeping requirements for facilities licensed under 10 CFR part 52.



- *Low-level waste transportation.* This proposed rule would allow a 45-day window for notification of receipt of shipments of low level radioactive waste (LLW). This increase from the current 20-day notification window is based on operating experience that shows that 45 days is an appropriate amount of time for notification of LLW shipments.

- *Spent fuel management planning.* This proposed rule would clarify requirements that the decommissioning documents contain information on spent fuel management planning in accordance with the regulatory requirements in § 72.218, “Termination of licenses.”

- *Backfit rule.* This proposed rule would clarify how the NRC applies § 50.109, “Backfitting,” to power reactor licensees in decommissioning.

- *Foreign ownership, control, or domination.* This proposed rule would specify when the foreign ownership, control, or domination (FOCD) prohibition found in § 50.38, “Ineligibility of certain applicants,” does not apply to an entity seeking a license for a facility in decommissioning and when a facility is no longer a production or utilization facility.

- *Clarification of scope of license termination plan requirement.* This proposed rule would clarify that the requirement for a license termination plan in §§ 50.82(a)(9) and 52.110(i) applies only to power reactor licensees that commenced operation.

### C. Costs and Benefits

The NRC prepared a draft regulatory analysis to determine the expected quantitative costs and benefits of this proposed rule, as well as qualitative factors to be considered in the NRC’s rulemaking decision. The conclusion of the analysis is that this

proposed rule would result in net savings to production and utilization facility licensees and the NRC. The analysis combines the costs and benefits from the decommissioning areas of EP, physical security, cyber security, drug and alcohol testing, CFH training, decommissioning funding assurance, offsite and onsite financial protection requirements and indemnity agreements, environmental considerations, records retention, low-level waste transportation, spent fuel management planning, application of the Backfit Rule, FOCD, and clarification of the scope of a license termination plan. The analysis discusses the economic impact to the nuclear industry, government, and society from the rulemaking and associated guidance.

The draft regulatory analysis discusses the cost benefit analysis for the various alternatives of each area of decommissioning proposed by the NRC, and shows that the NRC’s proposed rule and guidance development is overall cost beneficial to the nuclear industry, government, and society as shown in Table 1.

**Table 1 – Summary of Costs and Benefits (7% NPV)**

<b>Benefits</b>	<b>Costs</b>	<b>Net Benefit</b>
\$ 19,200,000	\$ (401,000)	\$ 18,799,000

The draft regulatory analysis also considers, in a qualitative fashion, regulatory efficiency, public health and safety, and common defense and security. For the regulatory efficiency aspect, this proposed rule would enable the NRC to better maintain and administer regulatory activities over the decommissioning process and ensure that the requirements for decommissioning production and utilization facilities are clear and appropriate. This proposed rule would also continue to provide reasonable assurance of adequate protection of the public health and safety and promote the common defense

and security and protect the environment at production and utilization facility sites that have started decommissioning.

Based on these quantitative and qualitative factors, the draft regulatory analysis concludes that the proposed rule should be adopted. For more information, please see the draft regulatory analysis available at the NRC's Agencywide Documents Access and Management System (ADAMS) under Accession No. ML18012A024.

**TABLE OF CONTENTS:**

- I. Obtaining Information and Submitting Comments
  - A. Obtaining Information
  - B. Submitting Comments
- II. Background
- III. Discussion
- IV. Scope of the Proposal
  - A. Emergency Preparedness
    - 1. Introduction
    - 2. Graded Approach for Emergency Preparedness
    - 3. Licensee Supporting Analyses and Commitments
    - 4. Post-Shutdown Emergency Plans
    - 5. Permanently Defueled Emergency Plans
    - 6. Independent Spent Fuel Storage Installation-Only Emergency Plans
    - 7. All Spent Fuel Removed from Site
    - 8. Changes to Emergency Plans
    - 9. Program Element Review Under § 50.54(t)
    - 10. Reasonable Assurance and Offsite Radiological Emergency Preparedness
    - 11. Clean-up of Regulations
    - 12. Revisions to § 72.32
  - B. Physical Security
  - C. Cyber Security
  - D. Drug and Alcohol Testing
  - E. Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor
  - F. Decommissioning Funding Assurance
  - G. Offsite and Onsite Financial Protection Requirements and Indemnity Agreements
  - H. Environmental Considerations
  - I. Record Retention Requirements
  - J. Low-Level Waste Transportation
  - K. Spent Fuel Management Planning
  - L. Backfit Rule
  - M. Foreign Ownership, Control, or Domination
  - N. Clarification of Scope of License Termination Plan Requirement
- V. Specific Requests for Comments
- VI. Section-by-Section Analysis
- VII. Regulatory Flexibility Certification

- VIII. Regulatory Analysis
- IX. Backfitting and Issue Finality
  - A. Current and Future Applicants
  - B. Existing Design Certifications
  - C. Existing Licensees
  - D. Backfit Analysis
    - 1. Introduction and Background
    - 2. Detailed Description of the Proposed Violation of Issue Finality
    - 3. Benefits: Substantial Increase in Public Health and Safety and Common Defense and Security
    - 4. Costs
    - 5. Determination of Substantial Benefits Justifying Costs of the Proposed Violation of Issue Finality
    - 6. Conclusion
    - 7. Evaluation of Factors in § 50.109(c)(1) through (9)
  - E. Draft Regulatory Guidance
- X. Cumulative Effects of Regulation
- XI. Plain Writing
- XII. National Environmental Policy Act
- XIII. Paperwork Reduction Act
- XIV. Criminal Penalties
- XV. Voluntary Consensus Standards
- XVI. Availability of Guidance
- XVII. Public Meeting
- XVIII. Availability of Documents

## I. Obtaining Information and Submitting Comments

### A. Obtaining Information

Please refer to Docket ID NRC-2015-0070 when contacting the NRC about the availability of information for this action. You may obtain publicly available information related to this action by any of the following methods:

- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID NRC-2015-0070.

- **NRC’s Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly available documents online in the ADAMS Public Documents collection at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select “[ADAMS Public Documents](#)” and then select “[Begin Web-based ADAMS](#)”

[Search.](#)” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov). For the convenience of the reader, instructions about obtaining materials referenced in this document are provided in the “Availability of Documents” section.

- **NRC’s PDR:** You may examine and purchase copies of public documents at the NRC’s PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

## B. Submitting Comments

Please address your comments to Rulemakings and Adjudications Staff, U.S. Nuclear Regulatory Commission and include Docket ID NRC-2015-0070 in your comment submission. If you cannot submit your comments on the Federal rulemaking Web site, <http://www.regulations.gov>, please contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC will post all comment submissions at <http://www.regulations.gov> as well as enter the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment

submissions to remove such information before making the comment submissions available to the public or entering the comment into ADAMS.

## **II. Background**

Under 10 CFR part 50 and 10 CFR part 52, the NRC requires current and future holders of operating licenses and current and future holders of combined licenses, respectively, to comply with a variety of regulatory requirements related to decommissioning. This section discusses previous rules that set out the NRC's requirements for production and utilization facility decommissioning and recent activities that have affected the NRC's regulatory framework and have led to the development of this proposed rule.

### **1988 Decommissioning Rule**

On June 27, 1988, the NRC published a final rule titled, "General Requirements for Decommissioning Nuclear Facilities" (53 FR 24018) (referred to herein as the "1988 Final Rule"), which established decommissioning requirements for various types of licensees. In this rule, the NRC amended its regulations to provide specific requirements for the decommissioning of nuclear facilities. Specifically, the final rule established regulations on acceptable decommissioning alternatives, planning for decommissioning, decommissioning timeliness, assurance of the availability of funds for decommissioning, and environmental review requirements related to decommissioning. The 1988 Final Rule amended the regulations that applied to applicants and licensees under 10 CFR part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material"; 10 CFR part 40, "Domestic Licensing of Source Material"; 10 CFR part 50; 10 CFR part 70, "Domestic Licensing of Special Nuclear Material"; and

10 CFR part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste."

The NRC defined decommissioning in the 1988 Final Rule as the "removal of nuclear facilities safely from service and reduction of residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license." The NRC also stated in the 1988 Final Rule that decommissioning activities do not include the removal and disposal of spent fuel, which is considered to be an operational activity, or the removal and disposal of nonradioactive structures and materials beyond that necessary to terminate the NRC license.

The purpose of the 1988 Final Rule, in part, was to ensure that reactor decommissioning would be carried out with minimal impact on public and occupational health and safety and the environment. The NRC's objective was that decommissioned facility sites would ultimately be available for unrestricted use for any public or private purpose. The amended regulations provided a regulatory framework for efficient and consistent licensing actions related to decommissioning.

The NRC noted in the 1988 Final Rule that, although decommissioning was not an imminent health and safety problem, the number and complexity of facilities that would require decommissioning was expected to increase, and inadequate or untimely consideration of decommissioning, specifically in the areas of planning and financial assurance, could result in significant adverse health, safety, and environmental impacts. The regulations issued in the 1988 Final Rule clearly state that the licensee is responsible for the funding and completion of decommissioning in a manner that protects public health and safety. The NRC stated, "With the increased number of decommissionings expected, case-by-case procedures would make licensing difficult

and increase NRC and licensee staff resources needed for these activities”  
(53 FR 24019).

The 1988 Final Rule required that, within 2 years after a licensee permanently ceases operation of a licensed nuclear facility, the licensee must submit a detailed decommissioning plan to the NRC for approval along with a supplemental environmental report that addresses environmental issues that have not already been considered. Based on these submittals, the NRC reviewed the licensee’s planned activities, prepared a safety evaluation report and an environmental assessment (EA), and either made a finding of no significant impact (the usual case) or prepared an environmental impact statement. Upon approval of the decommissioning plan, the NRC issued an order under § 2.202, “Orders,” permitting the licensee to decommission its facility in accordance with the approved plan. As part of the approval process for the decommissioning plan, the public had the opportunity to request a hearing under 10 CFR part 2, “Agency Rules of Practice and Procedure.” The NRC would terminate the license once the decommissioning process was completed and the NRC was satisfied that the facility had been radioactively decontaminated to an unrestricted release level under § 20.1402, “Radiological criteria for unrestricted use.”<sup>1</sup>

If the licensee chose to place the reactor in storage and dismantle it at a later time, the initial decommissioning plan submittal was not required to be as detailed as a plan for prompt dismantlement. However, before the licensee could begin dismantlement, the regulations required that the licensee submit a detailed plan and environmental report to the NRC for approval. Before the decommissioning plan was

---

<sup>1</sup> License termination based upon a facility meeting the unrestricted use criteria under § 20.1402 is the most common license termination scenario. The NRC may also terminate a facility license under restricted conditions (§ 20.1403, “Criteria for license termination under restricted conditions”) and under alternative criteria (§ 20.1404, “Alternative criteria for license termination”).



approved, the licensee could not perform any major decommissioning activities. If a licensee desired a reduction in requirements because of the permanent cessation of operations, it had to obtain a license amendment for possession-only status. This possession-only license amendment was usually granted after the licensee indicated that the reactor had permanently ceased operations and that fuel had been permanently removed from the reactor vessel. Three examples of licensees that were granted possession-only status are Yankee Atomic Electric Company for the Yankee Nuclear Power Station (Yankee Rowe) (August 5, 1992; ADAMS Accession No. ML17283A069), Portland General Electric Company for the Trojan Nuclear Power Plant (May 5, 1993; ADAMS Accession No. ML18095A126), and Sacramento Municipal Utility District for the Rancho Seco Nuclear Generating Station (March 17, 1992; ADAMS Accession No. ML17283A071).

The 1988 Final Rule required licensees to provide assurance that, at any time during the life of the facility through termination of the license, adequate funds will be available to complete decommissioning. For operating reactors, the 1988 Final Rule prescribed the required amount of decommissioning funding in § 50.75. The 1988 Final Rule also imposed the requirement that, 5 years before license expiration or cessation of operations, licensees must submit a preliminary decommissioning plan containing a site-specific decommissioning cost estimate and appropriately adjust the financial assurance mechanism. In addition, the 1988 Final Rule required licensees to submit a decommissioning plan, including a site-specific cost estimate for decommissioning and a correspondingly adjusted financial assurance mechanism, within 2 years after permanent cessation of operations. For delayed dismantlement of a nuclear facility, the 1988 Final Rule required licensees to submit an updated decommissioning plan with the estimated cost covering the delay of decommissioning and to appropriately adjust the

financial assurance mechanism. Before approval of the decommissioning plan, the 1988 Final Rule specified that licensee use of the decommissioning funds would be determined on a case-specific basis for premature closure, when the accrual of required decommissioning funds may be incomplete.

### **1996 Decommissioning Rule**

On July 29, 1996, the NRC amended its regulations for reactor decommissioning to clarify ambiguities, codify procedures that reduced regulatory burden, provide greater flexibility, and allow for greater public participation in the decommissioning process in a final rule titled, "Decommissioning of Nuclear Power Reactors" (61 FR 39278) (referred to herein as the "1996 Final Rule"). The 1996 Final Rule made fundamental changes to power reactor decommissioning by streamlining the process and reducing both licensee and NRC resource expenditures while maintaining safety, protecting the environment, and encouraging public involvement.

In the 1996 Final Rule, the NRC explained that the degree of regulatory oversight required for a nuclear power reactor in decommissioning is considerably less than that required for a facility during its operating stage. During the operating stage of the reactor, fuel in the reactor core undergoes a controlled nuclear fission reaction that generates a high neutron flux and large amounts of heat. Safe control of the nuclear reaction involves the use and operation of many complex systems. First, the nuclear reaction must be carefully controlled through neutron-absorbing mechanisms. Second, the heat generated must be removed so that the fuel and its supporting structure do not overheat. Third, the confining structure and ancillary systems must be maintained and degradation caused by radiation and mechanical and thermal stress ameliorated. Fourth, the radioactivity resulting from the nuclear reaction in the form of direct radiation

(especially near the high neutron flux areas around the reactor vessel) and any radiologically contaminated materials and radiological effluents (gaseous and liquid) must be minimized and controlled. Moreover, proper operating procedures must be established and maintained with appropriately trained staff to ensure that the reactor system is properly operated and maintained, and that operating personnel minimize their exposure to radiation when performing their duties. Finally, emergency response procedures must be established and maintained to protect the public in the event of an accident.

Decommissioning of a nuclear power reactor begins when the nuclear fission reaction is stopped and the fuel (in the form of spent fuel assemblies) is permanently removed from the reactor vessel and placed in the SFP until transferred to interim storage in an onsite ISFSI or transported offsite for storage or disposal. While the spent fuel is still highly radioactive and generates heat caused by radioactive decay, the fuel slowly cools as its energetic decay products diminish. The SFP, which contains circulating water, removes the decay heat and filters out any small radioactive contaminants escaping the spent fuel assemblies. The SFP system is relatively simple to operate and maintain compared to an operating power reactor. The remainder of the facility may contain radioactive contamination in areas that were directly impacted by reactor operation, and will be more highly contaminated in the area of the reactor vessel. However, because the spent fuel is stored in a configuration that precludes the nuclear fission reaction, no generation of new radioactivity can occur. Once the nuclear fission process has permanently ceased and the fuel assemblies have been removed from the reactor vessel, safety concerns for an SFP are greatly reduced because there is no longer generation of large amounts of heat, high neutron flux and related materials

degradation, and other related stresses that result from the functioning of an operating reactor system.

Contaminated areas of the facility must still be controlled to minimize radiation exposure to personnel and control the spread of radioactive material. This situation is now similar to a contaminated materials facility and does not require the oversight that an operating reactor would require.

The amendments issued in the 1996 Final Rule provided licensees with simplicity and flexibility in implementing the decommissioning process, especially with regard to premature closure. The amendments clarified ambiguities in the regulations existing at the time, codified procedures and terminology that had been used in a number of specific cases, and increased opportunities for the public to become informed about the licensee's decommissioning activities. The amendments established a level of NRC oversight commensurate with the level of safety concerns expected during decommissioning activities. Specifically, the 1996 Final Rule established or modified requirements with regard to initial decommissioning activities, major decommissioning activities, and license termination procedures.

With regard to initial decommissioning activities, the 1996 Final Rule mandated that, once a licensee permanently ceases operation of the power reactor and removes the fuel assemblies from the reactor vessel, it could not undertake any major decommissioning activities until it provided the public and the NRC with additional information about the proposed decommissioning approach. The NRC required that the licensee submit this information in the form of a PSDAR, which consists of the licensee's proposed decommissioning activities and schedule through license termination, a discussion of the reasons for concluding that the environmental impacts associated with the proposed site-specific decommissioning activities will be bounded by appropriate

previously issued environmental impact statements, and a decommissioning cost estimate for the proposed activities. The NRC makes the PSDAR available to the public for comment and holds a public meeting concerning the PSDAR in the vicinity of the plant. The NRC, however, does not approve the PSDAR and the submission of the PSDAR and its review by the NRC does not require the licensee to request a license amendment or any other approval.

The 1996 Final Rule also established that the licensee may not begin performing major decommissioning activities until 90 days after the NRC receives the PSDAR submittal and until the licensee submits the certifications under § 50.82(a)(1) that operations have permanently ceased and that fuel has been permanently removed from the reactor vessel. The 1996 Final Rule also amended certain 10 CFR part 50 technical requirements to cover the transition of the facility from operating to permanently shutdown status. Specifically, the 1996 Final Rule removed the requirement for a licensee that has permanently ceased operations and removed fuel from the reactor vessel to obtain a license amendment before proceeding with certain decommissioning activities within established regulatory constraints (i.e., in accordance with § 50.59, “Changes, tests and experiments”). These changes to the decommissioning requirements increased the flexibility in the type of actions that licensees could undertake without prior NRC approval.

With regard to major decommissioning activities, the 1996 Final Rule implemented a major change from the 1988 Final Rule in that power reactor licensees would no longer be required to have an approved decommissioning plan before being permitted to perform major decommissioning activities. The 1996 Final Rule allowed licensees to perform activities that meet the criteria in § 50.59, which the NRC amended to include additional criteria to ensure that licensees consider concerns specific to

decommissioning. Based on NRC experience with licensee decommissioning activities at the time, the NRC recognized that the § 50.59 process used by the licensee during reactor operations encompassed routine activities that were similar to those undertaken during the decommissioning process. The NRC concluded that the licensee could use the § 50.59 process to perform major decommissioning activities if licensing conditions and the level of NRC oversight required during reactor operations continued during decommissioning, commensurate with the status of the facility being decommissioned. The 1996 Final Rule also required the licensee to provide written notification to the NRC before performing any decommissioning activity that is inconsistent with, or makes significant schedule changes from, the actions and schedules described in the PSDAR.

With regard to license termination, the 1996 Final Rule required that a licensee wishing to terminate its license submit a license termination plan for NRC approval. The approval process for the termination plan provides for a hearing opportunity under 10 CFR part 2. The licensee must submit a supplemental environmental report that considers new and significant environmental changes associated with license termination activities. The 1996 Final Rule imposed an additional requirement for the purpose of keeping the public informed. A public meeting, similar to the one held after the PSDAR submittal, must take place after the licensee submits its license termination plan to the NRC.

The 1996 Final Rule continued the same degree of decommissioning financial assurance that was previously required but provided more flexibility by allowing licensees to have limited, early use of decommissioning funds. The NRC presented this provision in a February 3, 1994, draft policy statement titled, "Use of Decommissioning Trust Funds before Decommissioning Plan Approval" (59 FR 5216), which was published for comment and eventually incorporated into the 1996 Final Rule. Before

issuance of the 1996 Final Rule, licensee use of these funds was determined on a case-specific basis for prematurely shutdown plants. However, the 1996 Final Rule eliminated the requirement for a decommissioning plan and instead required a PSDAR submittal, which requires a decommissioning cost estimate. The 1996 Final Rule permitted 3 percent of the decommissioning funds generically required by § 50.75 to be available to the licensee for decommissioning planning purposes. Moreover, to permit the licensee to accomplish major decommissioning activities promptly, an additional 20 percent of the generic funding amount would be made available 90 days after the NRC had received the PSDAR if the licensee had also submitted the certifications required by § 50.82(a)(1). The use of any funds above those amounts required the licensee to submit a site-specific decommissioning cost estimate to the NRC prior to the use of those funds.

### **Post-1996 Final Rule Decommissioning Activity**

In a series of Commission papers issued between 1997 and 2001, the NRC staff provided options and recommendations to the Commission to address regulatory improvements related to power reactor decommissioning. To consolidate these recommendations, in the Staff Requirements Memorandum (SRM) for SECY-99-168, “Staff Requirements—SECY-99-168—Improving Decommissioning Regulations for Nuclear Power Plants,” dated December 21, 1999 (ADAMS Accession No. ML003752190), the Commission directed the NRC staff to proceed with a single, integrated, risk-informed decommissioning rule addressing the areas of EP, insurance, safeguards, staffing and training, and backfitting for decommissioning power reactors. The objective of the rulemaking was to clarify and remove certain regulations for

decommissioning power reactors based in large part on the reduction in radiological risk compared to operating reactors.

On June 28, 2000, the NRC staff submitted SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," to the Commission (ADAMS Accession No. ML003721626). In this paper, the NRC staff proposed an integrated decommissioning rulemaking plan and requested Commission approval to proceed with developing an integrated rulemaking for nuclear power plant decommissioning in accordance with the recommendations detailed in the rulemaking plan. The paper addressed the regulatory areas of EP, insurance, safeguards, staffing and training, and backfitting for decommissioning power reactors. The rulemaking plan was contingent on the completion of a SFP zirconium fire risk study. The Commission responded to SECY-00-0145 in an SRM dated September 27, 2000 (ADAMS Accession No. ML003754381). The Commission returned that SECY to the staff without a vote on the rulemaking plan pending further developments in the area and requested that the staff submit a revised paper to the Commission.

### **Spent Fuel Pool Studies**

In the late 1990s and early 2000s, the NRC was assessing the risk of an SFP accident at a power reactor site in decommissioning. Following the removal of spent fuel from the reactor, the principal radiological risks are associated with the storage of spent fuel on site. Generally, a few months after the reactor has been permanently shut down and defueled, there are no possible design-basis accidents that could result in a radiological release exceeding the limits established by the U.S. Environmental Protection Agency (EPA) early-phase Protective Action Guides (PAGs) at the exclusion area boundary (EPA-400-R-92-001, "Manual of Protective Action Guides And Protective



Actions For Nuclear Incidents,” issued May 1992, and final revision EPA-400/R-17/001, “PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents,” issued January 2017). The only SFP accident scenario that might lead to a release with offsite consequences exceeding the PAGs at a decommissioning reactor is a zirconium fire. The zirconium fire scenario is a postulated, but highly unlikely, beyond-design-basis accident scenario that involves a major loss of water inventory from the SFP, resulting in a significant heatup of the spent fuel, and culminating in substantial zirconium cladding oxidation, fire, and fuel damage. The significance of spent fuel heatup scenarios that might result in a zirconium fire depends on the decay heat of the irradiated fuel stored in the SFP. Therefore, the probability of a zirconium fire scenario continues to decrease as a function of the time that the decommissioning reactor has been permanently shut down and defueled.

In the 1980s, the NRC examined the risk of an SFP accident as Generic Safety Issue 82, “Beyond Design Basis Accidents in Spent Fuel Pools,” because of the increased use of high-density storage racks and laboratory studies that indicated the possibility of a zirconium fire spreading between assemblies in an air-cooled environment (see Section 3 of NUREG-0933, “Resolution of Generic Safety Issues,” issued December 2011 (available at

<https://www.nrc.gov/sr0933/Section%203.%20New%20Generic%20Issues/082r3.html>)).

The risk assessment and cost benefit analyses developed through this effort (Section 6.2 of NUREG-1353, “Regulatory Analysis for the Resolution of Generic Issue 82, ‘Beyond Design Basis Accidents in Spent Fuel Pools,’” issued April 1989 (ADAMS Accession No. ML082330232)) concluded that the risk of a severe accident in the SFP was low and appeared to meet the public health objectives of the Commission’s Safety

Goal Policy Statement (51 FR 30028; August 21, 1986) and that no new regulatory requirements were warranted.

To support the rulemaking for decommissioning nuclear power plants in the late 1990s, the NRC reevaluated the risk of an SFP accident. The NRC's assessment in NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," issued February 2001 (ADAMS Accession No. ML010430066), conservatively assumed that if the water level in the SFP dropped below the top of the spent fuel, an SFP zirconium fire involving all of the spent fuel would occur and thereby bounded those conditions associated with air cooling of the fuel (including partial draindown scenarios) and fire propagation. Even with this conservative assumption, the study found the risk of an SFP fire to be low and well within the Commission's safety goals.

Although NUREG-1738 did not completely rule out the possibility of a zirconium fire, it did demonstrate that storage of spent fuel in a high-density configuration in SFPs is safe and that the risk of accidental release of a significant amount of radioactive material to the environment is low. The study used simplified and sometimes bounding assumptions and models to characterize the likelihood and consequences of beyond-design-basis SFP accidents. Subsequent NRC regulatory activities and studies (described in more detail hereafter) have reaffirmed the safety and security of spent fuel stored in pools and have demonstrated that SFPs are effectively designed to prevent accidents and minimize damage from malevolent attacks.

In the wake of the terrorist attacks of September 11, 2001, the NRC took several actions to further reduce the possibility of an SFP fire. The NRC issued immediately effective nonpublic orders (see the cover letter at ADAMS Accession No. ML020510637) that required licensees to implement additional security measures, including increased

patrols, augmented security forces and capabilities, and more restrictive site-access controls to reduce the likelihood of an SFP accident resulting from a terrorist-initiated event. A memorandum to the Commission titled, "Documentation of Evolution of Security Requirements at Commercial Nuclear Power Plants with Respect to Mitigation Measures for Large Fires and Explosions," dated February 4, 2010 (ADAMS Accession No. ML092990438), provides a comprehensive discussion of these actions, some of which specifically address SFP safety and security.

New requirements to mitigate a postulated loss of SFP water inventory were also implemented following the terrorist attacks of September 11, 2001; these requirements resulted in enhanced spent fuel coolability and the potential to recover SFP water level and cooling prior to a postulated SFP zirconium fire. Based on the implementation of these additional strategies, the probability and, accordingly, the risk to the public health and safety of an SFP zirconium fire scenario has decreased and is expected to be less than previously analyzed in NUREG-1738 and previous studies.

The NRC also addressed the issue of potential aircraft impacts to the SFP by order after the events of September 11, 2001; that order required licensees to have in place mitigating strategies for large fires or explosions at nuclear power plants. The Nuclear Energy Institute (NEI) provided detailed guidance in NEI 06-12, Revision 2, "B.5.b Phase 2 & 3 Submittal Guideline," dated December 2006 (ADAMS Accession No. ML070090060). The NRC found this guidance acceptable for use as documented in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Section 19.4, "Strategies and Guidance to Address Loss of Large Areas of the Plant Due to Explosions and Fires," Revision 0, dated June 2015 (ADAMS Accession No. ML13316B202). The NRC's issuance of the final rule titled, "Power Reactor Security Requirements," on March 27, 2009 (74 FR

13926), made the requirements of the order generically applicable. In that final rule, the NRC added § 50.54(hh)(2) to require licensees to develop and implement guidance and strategies to, among other things, maintain or restore SFP cooling capability in the event of loss of large areas of the plant resulting from fires or explosions, which further decreases the probability of an SFP fire.

Under § 50.54(hh)(2), power reactor licensees are required to implement strategies such as those provided in NEI 06-12. The NEI guidance specifies that portable, power independent pumping capabilities must be able to provide at least 500 gallons per minute of bulk water makeup to the SFP and at least 200 gallons per minute of water spray to the SFP. Recognizing that the SFP is more susceptible to a release when the spent fuel is in a nondispersed configuration, the guidance also specifies that the portable equipment should be capable of being deployed within 2 hours for a nondispersed configuration.

Further, other organizations, such as Sandia National Laboratories (SNL), have confirmed the effectiveness of the additional mitigation strategies to maintain spent fuel cooling in the event that the pool is damaged and its initial water inventory is reduced or lost entirely. The analyses conducted by SNL (collectively referred to as the “Sandia studies”) are sensitive security-related information and are not available to the public. The Sandia studies considered spent fuel loading patterns and other aspects of a pressurized water reactor SFP and a boiling water reactor SFP, including the role that the circulation of air plays in the cooling of spent fuel when there is a partial or complete loss of water. The Sandia studies indicated that there is a significant amount of time between the initiating event (i.e., the event that causes the SFP water level to drop) and the point at which the spent fuel assemblies become partially or completely uncovered. In addition, the Sandia studies indicated that for those hypothetical conditions in which

air cooling may not be effective in preventing a zirconium fire, there is a significant amount of time between the spent fuel becoming uncovered and the possible onset of such a zirconium fire, thereby providing a substantial opportunity for event mitigation. The Sandia studies, which account for relevant heat transfer and fluid flow mechanisms, also indicated that air cooling spent fuel could be sufficient to prevent SFP zirconium fires at a point much earlier following fuel offload from the reactor than previously considered (e.g., in NUREG-1738).

In NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor," issued September 2014 (ADAMS Accession No. ML14255A365), the NRC evaluated the potential benefits of strategies required in § 50.54(hh)(2). The report explains that successful implementation of mitigation strategies significantly reduces the likelihood of a release from the SFP in the event of a loss of cooling water. Additionally, the NRC found that the placement of spent fuel in a dispersed configuration in the SFP would have a positive effect in promoting natural circulation, which enhances air coolability and thereby reduces the likelihood of a release from a completely drained SFP. The NRC issued Information Notice 2014-14, "Potential Safety Enhancements to Spent Fuel Pool Storage," dated November 14, 2014 (ADAMS Accession No. ML14218A493), to all licensees to inform them of the insights from NUREG-2161. This information notice describes the benefits of storing spent fuel in more favorable configurations, placing spent fuel in dispersed patterns immediately after core offload, and taking action to improve mitigation strategies.

In 2013, the NRC documented a regulatory analysis in COMSECY-13-0030, "Staff Evaluation and Recommendation for Japan Lessons Learned Tier 3 Issue on Expedited Transfer of Spent Fuel" (ADAMS Accession No. ML13329A918), which

considered a broad history of the NRC's oversight of spent fuel storage and SFP operating experience (domestic and international) and relied on information compiled in NUREG-2161. In COMSECY-13-0030, the NRC staff concluded that SFPs are robust structures with large safety margins and recommended to the Commission that further regulatory actions to require the expedited transfer of spent fuel from SFPs to dry cask storage were not warranted. The Commission subsequently approved the staff's recommendation in SRM-COMSECY-13-0030, dated May 23, 2014 (ADAMS Accession No. ML14143A360).

In addition, in response to the Fukushima Dai-ichi accident, the NRC is currently implementing regulatory actions to further enhance reactor and SFP safety. On March 12, 2012, the NRC issued Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" (ADAMS Accession No. ML12054A679), which requires licensees to install reliable means of remotely monitoring wide-range SFP levels to support effective prioritization of event mitigation and recovery actions in the event of a beyond-design-basis external event. Although the primary purpose of the order was to ensure that operators were not distracted by uncertainties related to SFP conditions during the accident response, the improved monitoring capabilities would help in the diagnosis and response to potential losses of SFP integrity. In addition, also on March 12, 2012, the NRC issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A735), which requires licensees to, among other actions, develop, implement, and maintain guidance and strategies to maintain or restore SFP cooling capabilities independent of normal alternating current power systems following a beyond-design-basis external event. Further, the NRC staff submitted the Mitigation of Beyond-Design-Basis Events

(MBDBE) draft final rule to the Commission in December 2016 (SECY-16-0142, “Draft Final Rule—Mitigation of Beyond-Design-Basis Events,” dated December 15, 2016 (ADAMS Accession No. ML16301A005)). The MBDBE rule would, among other things, make these two orders generically applicable. These requirements ensure that a more reliable and robust mitigation capability is in place to address degrading conditions in SFPs resulting from certain significant, but unlikely, events.

The additional mitigation strategies implemented subsequent to the terrorist attacks of September 11, 2001, such as the issuance of § 50.54(hh)(2) and the NRC’s review and approval of NEI 06-12, and the issuance of Orders EA-12-049 and EA-12-051 following the Fukushima Dai-ichi accident enhance spent fuel coolability and the potential to recover SFP water level and cooling before the initiation of a potential SFP zirconium fire. The Sandia studies also confirmed the effectiveness of additional mitigation strategies to maintain spent fuel cooling in the event that the pool is drained. Based on this more recent information and the implementation of additional strategies, the probability of an SFP zirconium fire initiation in a draindown event is expected to be less than that reported in NUREG-1738 and previous studies.

### **Changes in Power Reactor Decommissioning at the NRC and within the Nuclear Power Industry**

On June 4, 2001, the NRC staff submitted SECY-01-0100, “Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools” (ADAMS Accession No. ML011450420), to the Commission. Before the Commission responded to SECY-01-0100, the terrorist attacks of September 11, 2001, occurred. Given the security implications of those events and the results of the NUREG-1738 zirconium fire

risk study that showed the risk of an SFP fire to be low and well within the Commission's safety goals, the NRC later redirected its rulemaking priorities and resources to focus on programmatic regulatory changes related to safeguards and security. In a memorandum to the Commission titled, "Status of Regulatory Exemptions for Decommissioning Plants," dated August 16, 2002 (ADAMS Accession No. ML030550706), the NRC staff justified this redirection in part by observing that no additional permanent reactor shutdowns were anticipated in the foreseeable future and that no immediate need existed to proceed with the decommissioning regulatory improvement work that was planned. The NRC staff concluded that, if any additional reactors permanently shut down after the rulemaking effort was suspended, establishment of the decommissioning regulatory framework would continue to be addressed for each facility through the license amendment and exemption processes.

Between 1998 and 2013, no power reactors permanently ceased operation. Between 2013 and 2016, however, six power reactors permanently shut down, defueled, and entered decommissioning. Notably, in 2013, four power reactor units permanently shut down without significant advance notice or preplanning: Crystal River Unit 3 Nuclear Generating Plant (Duke Energy Florida); Kewaunee Power Station (Dominion Energy); and San Onofre Nuclear Generating Station (SONGS), Units 2 and 3 (Southern California Edison). In addition, on December 29, 2014, Entergy Nuclear Operations, Inc. (Entergy) permanently ceased operations at the Vermont Yankee Nuclear Power Station (VY), and on October 24, 2016, the Omaha Public Power District permanently ceased operations at Fort Calhoun Station, Unit 1. Licensees have also announced plans for additional near-term permanent shutdowns, including Oyster Creek Nuclear Generating Station (Exelon Generation Company, LLC (Exelon)); Pilgrim Nuclear Power Station (Entergy); Three Mile Island Nuclear Station, Unit 1 (Exelon); Davis-Besse Nuclear



Power Station, Unit 1 (FirstEnergy Nuclear Operating Co. (FENOC)); Indian Point Nuclear Generating, Units 2 and 3 (Entergy); Perry Nuclear Power Plant, Unit 1 (FENOC); Beaver Valley Power Station, Units 1 and 2 (FENOC); Palisades Nuclear Plant (Entergy); and Diablo Canyon Power Plant, Units 1 and 2 (Pacific Gas & Electric Co.).

Decommissioning reactor licensees and the NRC have expended substantial resources processing licensing actions for power reactors during their transition period to decommissioning status. Consistent with the power reactors that permanently shut down in the 1990s, the licensees that are currently transitioning to decommissioning have been requesting NRC review and approval of licensing actions, informed by the low risk of an offsite radiological release posed by a decommissioning reactor. Specifically, the licensees are seeking NRC approvals of exemptions from requirements and license amendments to reflect the reduced operations and radiological risks posed by a permanently shutdown and defueled reactor.

### **Decommissioning Lessons Learned Report**

In October 2016, the NRC published the “Power Reactor Transition from Operations to Decommissioning: Lessons Learned Report” (ADAMS Accession No. ML16085A029). The report documents the lessons learned by the NRC and stakeholders associated with permanent power reactor shutdowns during the period from 2013 to 2016. In particular, the report focuses on the transition from reactor operations to decommissioning for Kewaunee, Crystal River Unit 3, SONGS Units 2 and 3, and VY. The transition process includes the NRC’s review and approval of certain requests for exemption from the NRC’s regulations and for license amendments to modify the operating reactors’ licensing bases to reflect those of decommissioning

reactors. After these actions are complete, the NRC then transfers the project management and oversight responsibility from its Office of Nuclear Reactor Regulation to its Office of Nuclear Material Safety and Safeguards (NMSS). Project management support is provided by NMSS for these decommissioning reactors until license termination. The report also provides a number of best practices identified from recent experience with reactor shutdowns and the transition to decommissioning.

The report highlights some of the challenges experienced by the NRC during the decommissioning transition licensing reviews from 2013 to 2016 and the NRC's actions to address those challenges. The report also discusses external stakeholders' interest in the NRC's review of the decommissioning transition licensing activities, especially those associated with SONGS Units 2 and 3 and VY, as represented by requests for public hearings and meetings and questions to the NRC staff.

In addition to the lessons learned and best practices, the report provides detailed project management guidance, recommendations, and documentation of precedent related to the reviews and evaluations specific to the types of licensing actions that the NRC expects to be processed during the decommissioning transition period, including oversight activities and communications. The NRC considered many of the lessons learned and recommendations described in this report during the development of this proposed rule.

### **Initiation of this 2018 Proposed Rule**

In light of the number of licensees deciding to permanently shut down their nuclear power reactors, the Commission directed the NRC staff to proceed with an integrated rulemaking on power reactor decommissioning in an SRM dated December 30, 2014 (ADAMS Accession No. ML14364A111), associated with SECY-14-

0118, "Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements," dated October 29, 2014 (ADAMS Accession No.

ML14219A444). The Commission further stated that this rulemaking should address:

- Issues discussed in SECY-00-0145 such as the graded approach to EP;
- Lessons learned from the plants that have already gone through (or are currently going through) the decommissioning process;
- The advisability of requiring a licensee's PSDAR to be approved by the NRC;
- The appropriateness of maintaining the three existing options for decommissioning (DECON, SAFSTOR, and ENTOMB)<sup>2</sup> and the timeframes associated with those options;
- The appropriate role of State and local governments and non-governmental stakeholders in the decommissioning process; and
- Any other issues deemed relevant by the NRC staff.

In SECY-15-0014, "Anticipated Schedule and Estimated Resources for a Power Reactor Decommissioning Rulemaking," dated January 30, 2015 (ADAMS Accession No. ML15082A089, redacted), the NRC staff committed to proceed with a rulemaking on power reactor decommissioning and provided an anticipated schedule and estimate of the resources required for the completion of a decommissioning rulemaking.

### **Advance Notice of Proposed Rulemaking**

To begin the power reactor decommissioning rulemaking process, the NRC gathered information by publishing an advance notice of proposed rulemaking (ANPR) in

---

<sup>2</sup> Additional information about the existing options for decommissioning is available in NUREG/BR-0521, Rev. 1, "Decommissioning Nuclear Power Plants," dated June 2017 (ADAMS Accession No. ML17177A253).

the *Federal Register* on November 19, 2015 (80 FR 72358). In the ANPR, the NRC sought public comment on specific questions and issues with respect to possible revisions of the NRC's decommissioning requirements. The NRC staff considered the comments received on the ANPR in its formulation of a draft regulatory basis for further regulatory action. Section 5 of the draft regulatory basis (ADAMS Accession No. ML17047A413) summarizes the public comments received on the ANPR.

### **Regulatory Basis**

The NRC published the draft regulatory basis in the *Federal Register* on March 15, 2017 (82 FR 13778). In the draft regulatory basis, the NRC staff presented draft recommendations for amendments to the NRC's regulations and guidance development to provide regulatory improvements for power reactors transitioning to decommissioning. The NRC requested public comment on these recommendations and asked specific questions regarding other possible revisions of the NRC's requirements. In addition, the NRC published a preliminary draft regulatory analysis on May 9, 2017 (82 FR 21481). The NRC held a public meeting from May 8–10, 2017, to discuss the draft regulatory basis and the associated preliminary draft regulatory analysis and issued a summary of the meeting on November 15, 2017 (ADAMS Accession No. ML17157B211).

The NRC received 40 public comment submissions on the draft regulatory basis and preliminary draft regulatory analysis, which it considered in its formulation of the

revised regulatory basis. The NRC published a *Federal Register* notice announcing the public availability of the regulatory basis on November 27, 2017 (82 FR 55954).<sup>3</sup>

### **III. Discussion**

#### **Current Regulatory Process**

Decommissioning requirements for production and utilization facilities are codified in §§ 50.82 and 52.110. Associated decommissioning funding requirements are codified in §§ 50.75, 50.82, and 52.110. A nuclear power reactor licensee formally begins the decommissioning process when it certifies its permanent cessation of operations and permanent removal of fuel from the reactor vessel under §§ 50.82(a)(1) or 52.110(a). Once the NRC docket these certifications, the 10 CFR part 50 or 10 CFR part 52 license no longer authorizes operation of the reactor. Despite this withdrawal of authority to operate, a decommissioning nuclear power plant continues to retain a license under 10 CFR part 50 or 10 CFR part 52. For this reason, the decommissioning plant continues to be subject to many of the requirements that apply to plants authorized to operate under 10 CFR part 50 or 10 CFR part 52.

Regulations that are designed to protect the public against reactor operation related design-basis events that include conditions of normal operation, anticipated operational occurrences, and design-basis accidents (DBAs) are no longer applicable at a permanently shutdown and defueled reactor. For example, certain accident sequences for a reactor that is operating, such as loss of coolant accidents and anticipated transients without scram, are no longer relevant to a permanently shutdown

---

<sup>3</sup> At the time of publication of the regulatory basis, the rulemaking title was “Regulatory Improvements for Power Reactors Transitioning to Decommissioning.” During the development of the proposed rule, the scope of the rulemaking expanded to include all production and utilization facilities licensed under 10 CFR parts 50 and 52. In order to reflect this change, the NRC has changed the title of the rulemaking to “Regulatory Improvements for Production and Utilization Facilities Transitioning to Decommissioning.”

and defueled reactor. In addition, some regulations may not be relevant to certain SSCs because the SSCs are no longer required to be maintained, to operate, or to mitigate certain accidents, events, or transients, whether they are safety-related or security-related SSCs. Other regulations, although based on power operation of the plant, may continue to be applicable to the permanently defueled facility for a limited time, such as the standards for offsite radiological emergency preparedness (REP) plans under 10 CFR part 50 or 10 CFR part 52. Typically, the scope of NRC requirements can be reduced to those regulations and requirements that primarily pertain to the safe storage of the spent fuel in the SFP, as described in the site's final safety analysis report (FSAR).

Upon permanent cessation of reactor operations and removal of fuel from the reactor vessel, the licensee is likely to submit a significant number of licensing actions (amendment and exemption requests) to the NRC for review and approval based primarily on the reduced radiological risk to public health and safety. As discussed previously in this document, the types of potential accidents at decommissioning reactors are fewer, and the risks of radiological releases are reduced, when compared to those at an operating reactor. Therefore, to reflect this reduction in risk, licensees of decommissioning reactors typically request certain amendments to their licenses and certain exemptions from the NRC's regulations. These licensing actions, which are processed by the NRC during licensees' transition from operating to decommissioning status, establish the regulatory framework for reactors that have permanently shut down and defueled.

For non-power reactor facilities, § 50.82(b) requires that the licensee apply for license termination within two years following permanent cessation of operation. Each application for termination of a license must be accompanied, or preceded, by a

proposed decommissioning plan (DP). In addition to the DP required by § 50.82, § 50.75(f)(4) requires each licensee to submit a preliminary DP. The preliminary DP must be submitted at or about 2 years before the projected end of operation. In addition to the DP, § 51.53(d) requires each applicant for a license amendment approving a DP to submit a supplement to its environmental report (ER).

The decommissioning process for non-power reactor licensees begins with the removal of fuel as soon as possible after reactor operations permanently cease and the shipment of the fuel offsite in accordance with the U.S. Department of Energy, NRC, and U.S. Department of Transportation regulations. Under some circumstances, the licensee can apply for a possession-only license amendment under § 50.90, "Application for amendment of license, construction permit, or early site permit," after operations have ended and before decommissioning starts. The possession-only license amendment limits the licensee authority to only possess but not to operate the facility. If granted, a possession-only license amendment provides regulatory relief from the license and technical specification (TS) requirements for a non-power reactor in decommissioning. Further, the possession-only amendment permits the licensee to retain the facility, related radioactive byproduct material, and, in some cases, special nuclear material, pending approval of the DP.

In addition to requesting license amendments and exemptions, nuclear power reactor licensees can make certain changes without prior NRC approval if the changes are permitted by an NRC regulation. Licensees primarily use an evaluation process with criteria in § 50.59 to make changes in a facility (or procedures) as described in the FSAR (as updated), including changes to the PSDAR, without prior NRC approval. The licensee's updated FSAR should reflect changes to the decommissioning design-basis analyses, SSCs, and the licensee's organizations, processes, and procedures.

Licensees can also make changes without prior NRC approval as described in § 50.54(p) and § 50.54(q) (among others). In the case of non-power reactor facilities, the DP, which is put into effect with an order, provides for accommodation of any necessary changes in the DP and procedures through a process similar to the one in § 50.59.

The timing and implementation for some decommissioning licensing actions rely on an approach that recognizes the reduction in radiological risk after permanent cessation of power operation and removal of fuel from the reactor vessel. These risk reductions can be tied to several factors, including, but not limited to: (1) reduction of the radiological source term after cessation of power operation and removal of fuel from the reactor vessel, (2) elapsed time after permanent shutdown, and (3) type of long-term onsite fuel storage. The two areas where these additional risk reductions are considered in the early decommissioning process are EP and facility insurance and indemnity. The NRC will not approve exemptions from EP and insurance coverage requirements until analyses confirm that there are no DBAs that would require protective actions for the public resulting from a release of radioactive material with a dose exceeding the EPA's PAGs at the exclusion area boundary. The analyses also must assess a postulated beyond-design-basis zirconium fire scenario.

### **Objectives of this Proposed Rule**

This proposed rule would amend the current requirements for production and utilization facility licensees during decommissioning. Experience has demonstrated that licensees for decommissioning power reactors seek several exemptions and license amendments per site to establish a long-term licensing basis for decommissioning. Non-power production or utilization facility licensees typically seek license amendments in



decommissioning to change their 10 CFR part 50 operating licenses to possession-only licenses. By issuing a decommissioning rule, the NRC would establish regulations that would maintain safety and security at sites transitioning to decommissioning without the need to grant specific exemptions or license amendments in certain regulatory areas. Specifically, the decommissioning rulemaking would: (1) propose a regulatory regime that continues to provide reasonable assurance of adequate protection of public health and safety and the common defense and security at decommissioning sites; (2) ensure that the requirements for decommissioning are clear and appropriate; (3) adopt regulations to address generic issues applicable to all decommissioning power reactors that have historically been addressed through similarly worded exemptions or license amendments; and (4) identify, define, and resolve additional areas of concern related to the regulation of decommissioning licensees under 10 CFR parts 50 and 52.

Given that the current regulatory framework regarding decommissioning is adequate to protect public health and safety and the common defense and security, many of the new requirements proposed by this rulemaking are alternatives to the current requirements.

### **Applicability**

This proposed rule would apply to the following categories of license holders:

- Nuclear power reactors currently licensed under 10 CFR part 50
- Future nuclear power reactors licensed under 10 CFR part 50
- Nuclear power reactors currently licensed under 10 CFR part 52
- Future nuclear power reactors licensed under 10 CFR part 52

- Non-power production or utilization facilities and fuel reprocessing plants currently licensed under 10 CFR part 50
- Future non-power production or utilization facilities and fuel reprocessing plants licensed under 10 CFR part 50

### **Applicability to NRC Licensees during Operations**

The proposed rule includes changes in three areas that would apply to NRC licensees during operations: (1) the process to change a licensee's security plan, (2) the timing of decommissioning funding assurance reporting requirements, and (3) identification of 10 CFR 26.3, "Scope," as a regulation with substantive requirements that could result in criminal penalties if violated.

The NRC's regulations in § 50.54(p) establish processes that allow licensees to make changes to their security plans. The NRC is proposing that all power reactor licensees making a change under § 50.54(p)(2) submit in their report of the change a summary of any analysis that was completed to make the determination that the change does not decrease the safeguards effectiveness of the security plan. Additionally, the NRC is proposing to revise § 50.54(p) to include definitions of the terms "change" and "decrease in safeguards effectiveness." The application of these definitions is limited to use with the revised § 50.54(p) and will apply to all holders of 10 CFR part 50 operating licenses and 10 CFR part 52 combined licenses.

The proposed rule would change the timing of the decommissioning funding assurance reporting requirements in § 50.75(f)(1) to coordinate them with the ISFSI decommissioning reporting requirements in § 72.30, "Financial assurance and recordkeeping for decommissioning." This change would convert the biennial decommissioning funding status report required for 10 CFR part 50 and 10 CFR part 52

power reactor licensees to a triennial decommissioning funding status report as currently required for 10 CFR part 72 ISFSI licensees.

Current § 26.3 includes a substantive requirement and violations of this regulation should be subject to criminal penalties. Therefore, this proposed rule would remove § 26.3 from the list of provisions that are not subject to criminal penalties if violated in § 26.825(b).

### **Applicability to ISFSI-Only and Standalone ISFSI/Decommissioned Reactor Sites**

During the public comment period for the draft regulatory basis, the NRC received many comments on the applicability of the decommissioning rulemaking to “standalone ISFSI”<sup>4</sup> sites where the associated reactor has already been decommissioned in comparison with “ISFSI-only” sites. As part of this rulemaking effort, the NRC recommends standardizing the terms “ISFSI-only” and “standalone ISFSI/Decommissioned Reactor” as follows:

- “ISFSI-only” sites contain nuclear power reactor facilities that are still involved in decommissioning activities, but the spent fuel has been completely transferred from the SFPs to dry storage in an onsite ISFSI. For these facilities, the remaining decommissioning activities are primarily related to remediation of any remaining residual radioactivity at the site to meet the license termination and decommissioning criteria in 10 CFR part 20, subpart E. The “ISFSI-only” term refers to the location of the spent fuel;

---

<sup>4</sup> Given that the public comments referred to “standalone ISFSIs,” this proposed rule uses that same terminology. However, in accordance with Inspection Manual Chapter 2690, “Inspection Program for Dry Storage of Spent Reactor Fuel at Independent Spent Fuel Storage Installations and for 10 CFR Part 71 Transportation Packagings,” dated March 9, 2012, the NRC uses the term “away-from-reactor (AFR) ISFSI” to refer to “any general licensed ISFSI where decommissioning and final survey activities related to reactor operations are completed and the only remaining operation conducted under the 10 CFR part 50 license is the operation of the general licensed ISFSI.”

the term reflects that no spent fuel is stored in the SFP, and all of the spent fuel is in dry storage in an onsite ISFSI.

- “Standalone ISFSI/Decommissioned Reactor” sites are those former nuclear power reactor facilities where the license termination and decommissioning criteria in 10 CFR part 20, subpart E, have already been met, with the exception of the ISFSI area. The licensee’s 10 CFR part 50 license for the site has been reduced to an area that only encompasses the ISFSI facility (unless the facility ISFSI is licensed under a 10 CFR part 72 specific license, in which case the 10 CFR part 50 license is wholly terminated). The remaining activities at these facilities that are regulated by the NRC are spent fuel storage and the eventual decommissioning of the ISFSI itself, once the spent fuel has been permanently removed from the site. A 10 CFR part 72 specific license ISFSI is decommissioned in accordance with 10 CFR 72.54, “Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas.”

Accordingly, the proposed requirements would not apply to standalone ISFSI/Decommissioned Reactor sites because those licensees have already decommissioned their 10 CFR part 50 facilities and met the decommissioning and license termination criteria in 10 CFR part 20, subpart E, with the exception of the area encompassed by the remaining ISFSI. The proposed requirements are consistent with the licensing actions that the NRC has already approved for these licensees. In addition, the proposed requirements of this rulemaking would not be imposed on ISFSI-only licensees.

### **Graded Approach**

As the NRC reviewed the exemption and license amendment requests related to the recent power reactor decommissionings and noted the growing list of future planned

permanent shutdowns, as discussed in the “*Background*” section of this document, the NRC realized that the existing regulatory framework could and should be revised to provide for a more efficient decommissioning process. As early as the late 1990’s, the NRC contemplated an integrated rulemaking to provide an appropriate graded approach to the decommissioning process. A graded approach is a process by which the safety requirements and criteria adjust during the decommissioning process commensurate with several factors. These factors include the magnitude of any credible hazard involved, the particular characteristics of a facility, and the balance between radiological hazards and non-radiological hazards (e.g., fire, flood, chemical spill) as applicable to specific points in time within the decommissioning process. This approach would be a risk-informed process.

Currently, no explicit regulatory provisions distinguish requirements in several technical areas for a power reactor that has permanently ceased operations from those for an operating power reactor. To address this, the NRC is proposing to amend its regulations to provide an efficient regulatory framework for the transition to decommissioning. Under this proposed rule, the NRC would adopt an optional graded approach for several technical areas that provides a set of requirements commensurate with the reductions in radiological risk at each of four levels of decommissioning: (1) permanent cessation of operations and permanent removal of all fuel from the reactor vessel, (2) sufficient decay of fuel in the SFP such that it would not reach ignition temperature within 10 hours under adiabatic heatup conditions (i.e., a complete loss of SFP water inventory with no heat loss), (3) transfer of all fuel to dry storage, and (4) removal of all fuel from the site. Four technical areas of this proposed rule (Emergency Preparedness, Physical Security, Cyber Security, and Offsite and Onsite Insurance) use all or some of this graded approach.

## **Technical Basis for Graded Approach**

The NRC has approved exemptions from the emergency planning regulations in § 50.47, "Emergency plans," and appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR part 50 at several permanently shutdown and defueled power reactor sites. Licensees that have been granted EP exemptions must maintain an onsite emergency plan addressing the classification of an emergency, notification of emergencies to licensee personnel and offsite authorities, and coordination with designated offsite government officials following an event declaration so that, if needed, offsite authorities may initiate appropriate response actions. The EP exemptions also typically relieve the licensee from certain requirements of § 50.47 and appendix E to 10 CFR part 50 as they pertain to offsite radiological EP, including the requirement to maintain the 10-mile plume exposure pathway and the 50-mile ingestion pathway emergency planning zones (EPZs), at the appropriate levels in decommissioning. The NRC granted these exemptions based, in part, on its determination that there are no applicable design-basis accidents at a decommissioning licensee's facility that could result in an offsite radiological release exceeding the limits established by the EPA's early phase PAGs at the exclusion area boundary.

The NRC also relied on analyses from NUREG-1738 that showed that emergency planning would be of marginal benefit in reducing the risk of a beyond-design-basis zirconium fire in the SFP if the accident evolved slowly enough to allow mitigative measures and, if necessary, to allow offsite protective actions to be implemented without preplanning. This conclusion was based, in part, on the assumption that it would take at least 10 hours for spent fuel to heat up to the temperature at which the onset of fission product release is expected during an SFP

rapid draindown event. This 10-hour period would provide a substantial amount of time for the licensee to take onsite mitigation measures and, if necessary, for offsite authorities to take appropriate response actions to protect the public. To support the approval of exemptions from portions of the EP regulations, licensees had to demonstrate through site-specific analyses that in a draindown event at their SFP the fuel would not reach clad ignition temperature for at least 10 hours under adiabatic heatup conditions.

A 10-hour timeframe has been justified in the past for similar purposes. In the Low Power Rule (47 FR 30232; July 13, 1982), the NRC amended its regulations to clarify that no NRC or FEMA review, findings, and determinations concerning the state or adequacy of offsite emergency preparedness were necessary for issuance of operating licenses authorizing fuel loading and low power operation (i.e., up to 5 percent of rated power). The NRC determined that several factors contributed to a substantial reduction in risk and potential accident consequences for low power testing as compared to the higher risks in continuous full power operation. These factors included consideration of the reduced source term, the capability of mitigation systems, and the time scale for taking actions to identify and mitigate an accident. Even for a postulated low-likelihood, design-basis accident, which eventually results in release of fission products into the containment, at least 10 hours would be available to allow adequate precautionary actions to be taken to protect the public near the site.

To support a graded approach during decommissioning, the NRC further examined the certainty and margin provided by a 10-hour timeframe for the fuel to heat up in relation to the time for taking mitigating actions and appropriate EP response actions. The NRC conducted an applied research study ("Transmittal of Reports to Inform Decommissioning Plant Rulemaking for User Need Request NSIR-2015-001,"

dated May 31, 2016 (ADAMS Accession No. ML16110A416)) with three tasks: (1) to perform a task analysis that includes a timeline of responder actions at representative SFP configurations to mitigate a draindown event and determine its likelihood of success, (2) to analyze representative spent fuel to determine the decay time necessary for the fuel to remain below clad ignition temperature for at least 10 hours assuming adiabatic heatup conditions, and (3) to analyze the dose rate from the radionuclides released during a hypothetical spent fuel clad ignition accident. As demonstrated in these analyses, for many initiating events at decommissioning reactors, mitigative actions would have a high likelihood of preventing an uncontrolled spent fuel heatup. In cases where an uncontrolled heatup is not prevented, the heatup would be relatively slow, providing significant time before a radiological release. In the case of a radiological release, dose rates would be low enough such that significant additional time is available to take offsite actions to protect the public.

The NRC's analysis of spent fuel decay times provided information on fuel heatup time to 900 degrees Celsius (C) (i.e., the temperature at which the onset of fission product release is expected) as a function of decay time for both pressurized water reactor (PWR) and boiling water reactor (BWR) assemblies. The analysis also included sensitivities to the mass of the racks and the fuel configuration in the SFP. The NRC notes that the decay periods provided for PWRs and BWRs are based on studies that consider current operating parameters in the nuclear power industry (e.g., fuel types, enrichment, and fuel burnup levels). Based on this analysis, the NRC concluded that after a decay period of 10 months for BWRs or 16 months for PWRs, beginning when the reactor permanently shuts down, the spent fuel cannot reasonably heat up to clad ignition temperature within 10 hours after a draindown event. These decay periods are based on an adiabatic heatup to 900 degrees C assuming the decay heat value for



the hottest assembly (as opposed to an average assembly), a burnup of 60 gigawatt days per metric ton of heavy metal (GWd/MTHM), and accounting for the mass of the racks. The analysis assumption of 60 GWd/MTHM conservatively bounds current industry burnups and provides margin for potentially higher burnup rates. This analysis does not account for the additional time margin that would be provided if additional cooling mechanisms were available or would be provided by a more favorable SFP configuration such that the heat load is more uniformly distributed.

The NRC's analysis of dose rates shows that even in the event of a beyond-design-basis accident leading to a rapid draindown of the SFP and subsequent zirconium fire, there would be additional time margin on the order of several hours beyond the 10-hour heatup time during which protective actions could be taken to protect the public before the dose levels associated with EPA PAGs would be exceeded offsite.

In addition to the analyses performed by the NRC to support this rulemaking, as discussed in the "*Background*" section of this document, the conclusions of NUREG-1738 and NUREG-2161 support the technical basis for a graded approach during decommissioning as they provide insight into the risk of an offsite release and the effectiveness of mitigation measures.

- NUREG-2161 considered various spent fuel cooling mechanisms, as well as additional heat from oxidation. Previous studies found that earthquakes present the dominant risk for SFPs, so this analysis considered a severe earthquake with ground motion stronger than the maximum earthquake reasonably expected to occur for the reference plant, which would challenge the SFP integrity. The study considered two spent fuel configurations: high-density and low-density loading. The study also analyzed two cases for each scenario: one that credited the mitigation measures of

§ 50.54(hh)(2) (i.e., the strategies to maintain or restore SFP cooling in the event of a loss of large areas of the plant as a result of fire or explosion), and one in which those measures were not used or were unsuccessful. The study results showed that successful mitigation reduces the likelihood of a release and that the likelihood of a release was equally low for both high- and low-density loading in the SFP. The study found that a release is not expected to occur at the power reactor site studied for at least 72 hours following a beyond-design-basis seismic event that occurs more than 60 days after shutdown.

- NUREG-1738 contains the results of the NRC's evaluation of the potential accident risk for an SFP at a decommissioning power reactor in the United States. NUREG-1738 identified a zirconium cladding fire resulting from a substantial loss-of-water from the SFP as the only postulated scenario at a decommissioning power reactor that could result in a significant radiological release. While highly unlikely, the consequences of such an accident could lead to an offsite dose in excess of the EPA PAGs. Based on spent fuel storage design characteristics and operating practices considered in the analysis, the scenarios that lead to this condition have very low probabilities of occurrence. Accordingly, these scenarios are considered to be beyond the facility's design basis. Furthermore, as the spent fuel ages, the generation of decay heat decreases. After a certain amount of time, the overall risk of a zirconium fire becomes extremely low because of: (1) the large amount of time available for preventive and mitigating actions and (2) the increased probability that the decay heat will be low enough that the fuel will be air-coolable in the post-event configuration.

## **Levels of Decommissioning**

Using the aforementioned analyses as its technical basis, the NRC is proposing to amend its regulations to provide an efficient regulatory framework during decommissioning using a graded approach in several technical areas. This graded approach is commensurate with the reductions in radiological risk at four levels of decommissioning: (1) permanent cessation of operations and permanent removal of all fuel from the reactor vessel, (2) sufficient decay of fuel in the SFP such that it would not reach ignition temperature within 10 hours under adiabatic heatup conditions, (3) transfer of all spent fuel to dry storage, and (4) removal of all fuel from the site. These levels are discussed further as follows:

### **Level 1**

Licensees in Level 1 include power reactor licensees that have docketed certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel pursuant to § 50.82, "Termination of license," or § 52.110, "Termination of license." In this level, a decommissioning reactor is defueled and permanently shut down, but the spent fuel in the SFP is still susceptible to a zirconium fuel cladding fire within 10 hours under adiabatic heatup conditions.

### **Level 2**

In Level 2, the reactor is defueled and permanently shut down, and spent fuel in the SFP has decayed and cooled sufficiently such that it cannot heat up to clad ignition temperature within 10 hours under adiabatic conditions. The NRC has determined that this condition is reached after spent fuel has decayed for a minimum of either 10 months for a BWR or 16 months for a PWR or an alternative site-specific timeframe to be

approved by the NRC. The decay period could begin when the fuel is still in the reactor vessel but the reactor has permanently ceased operations. In order to verify that a licensee has met the condition, the NRC is proposing to amend §§ 50.4 and 52.3 to require that licensees include the actual, not planned, date of permanent cessation of operation in their certification of permanent removal of fuel.

In addition, the site may possess a radioactive inventory of liquid radiological waste, radioactive reactor components, and contaminated structural materials. The radioactive inventory may change, depending on the licensee's proposed shutdown activities and schedule.

### **Level 3**

In Level 3, all spent nuclear fuel (SNF) is in dry cask storage pursuant to the terms and conditions of a license granted under 10 CFR part 72. However, the licensee may still hold a 10 CFR part 50 or 10 CFR part 52 license, and the site may contain a radioactive inventory of liquid radiological waste, radioactive reactor components, and contaminated structural materials.

### **Level 4**

At this point in the facility's life cycle, all SNF has been removed from the site. The site may possess a radioactive inventory of liquid radiological waste, radioactive reactor components, and contaminated structural materials. The radioactive inventory during this configuration may change, depending on the licensee's proposed decommissioning activities and schedule.

As a facility transitions from being operational to having all SNF in dry cask storage, the proposed rule's regulatory requirements are graded to provide for

reasonable assurance of the health and safety of the public commensurate with the risk profile of the facility. Table 2 summarizes the proposed changes to decommissioning requirements in the technical areas that use aspects of this graded approach.

**Table 2—Summary of Graded Approach**

	<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;">                     Docketing of § 50.82/§ 52.110 certifications                 </div> <b>LEVEL 1</b>	<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;">                     Level 1 occurred and 10 months (BWR) or 16 months (PWR) have elapsed since permanent cessation of operations                 </div> <b>LEVEL 2</b>	<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;">                     All fuel in dry cask storage                 </div> <b>LEVEL 3</b>	<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;">                     All fuel offsite                 </div> <b>LEVEL 4</b>
<b>Emergency Preparedness</b>	§ 50.54(q)(7)(i): can use § 50.200(a) (PSEP) or § 50.54(q)(2) § 50.54(q)(8): provisions to change process	§ 50.54(q)(7)(ii): can use § 50.200(b) and § 50.200(c) (PDEP) or § 50.54(q)(2) or § 50.54(q)(7)(i)	§ 50.54(q)(7)(iii): can use § 72.32(a) or § 50.54(q)(2) or § 50.54(q)(7)(i) or § 50.54(q)(7)(iii) § 50.54(q)(8): change process in § 72.44(f) § 50.54(t)(3): review of EP program no longer required	§ 50.54(q)(7)(iv): need not comply with requirements of § 50.54(q)
<b>Physical Security</b>	§ 73.55(b), (e), (j), and (p): allow for PSP changes without prior approval		§ 72.212(b)(9)/§ 73.51(a)(2): can change from § 73.55 requirements to § 73.51	
<b>Cyber Security</b>		§ 73.54(l): removal of cyber security requirements		
<b>Onsite/Offsite Insurance</b>		§ 50.54(w)(5): reduction of onsite insurance to \$50 million 10 CFR part 140: reduction of offsite insurance to \$100 million		

#### IV. Scope of the Proposal

This rulemaking proposes revising requirements in 14 technical areas.

## **A. Emergency Preparedness**

### 1. Introduction

In 1978, an NRC and EPA task force established the planning basis for EP for nuclear power reactor accidents in NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants" (ADAMS Accession No. ML051390356). This guidance provides a basis for offsite radiological EP efforts for large light-water reactor facilities. In NUREG-0396, the task force determined that no single accident sequence should be identified as a planning basis and chose to provide recommendations in terms of the consequences and characteristics of accidents that would be important in determining the extent of the planning effort. The task force concluded that the EP planning basis requires consideration of a spectrum of accidents, informed by probability considerations. The scope of the planning effort was based on three key planning elements: (1) the distance to which planning for the initiation of predetermined protective actions is warranted, (2) the time-dependent characteristics of potential releases and exposures, and (3) the kinds of radioactive materials that can potentially be released to the environment. The risk-informed planning basis for EP, established in NUREG-0396, was endorsed for use in the NRC's policy statement, "Planning Basis for Emergency Responses to Nuclear Power Reactor Accidents," dated October 23, 1979 (44 FR 61123). This planning basis results in emergency plans that are effective, regardless of the accident probability.

The rationale in NUREG-0396 and the planning basis elements can also be applied to light water reactors in decommissioning to scope the planning effort. The NRC applied the NUREG-0396 methodology (i.e., consideration of a spectrum of accident consequences and the three key planning elements) to establish a graded

approach to EP for decommissioning power reactors that maintains public health and safety. As discussed in NUREG-0396, no single specific accident sequence should be isolated as the one for which to plan because each accident could have different consequences, both in nature and degree. Further, the range of possible selections for a planning basis is very large, starting with a zero point of requiring no planning at all, because significant offsite radiological accident consequences are unlikely to occur, to planning for the worst possible accident regardless of its extremely low likelihood. Fundamentally, the spectrum of possible accidents is significantly smaller, and the risk of an offsite radiological release is significantly lower, at a nuclear power facility that has permanently shut down and removed fuel from the reactor vessel than at an operating power reactor. All such accidents focus on the storage of spent fuel until its permanent removal from the site. In NUREG-1738, the NRC found that the event sequences important to risk at decommissioning sites are limited to large earthquakes and cask drop events. For EP assessments, this is an important difference relative to operating power reactors, where typically a large number of different sequences make significant contributions to risk.

Although the NRC considered the full spectrum of accidents applicable to a decommissioning power reactor, the number of events that can have significant offsite consequences is greatly reduced, and the events are dominated by the zirconium fire scenario—a postulated, but highly unlikely, beyond-design-basis accident that involves a major loss of water inventory from the SFP, resulting in a significant heatup of the spent fuel and culminating in substantial zirconium cladding oxidation, fire, and fuel damage. The guidance in NUREG-0396 states that while it is not appropriate to develop specific plans for the most severe and most improbable events, the characteristics of these events should be considered “in judging whether emergency plans based primarily on

smaller accidents can be expanded to cope with larger events.” This approach provides reasonable assurance that capabilities exist to minimize the impacts of even the most severe events. Consistent with this guidance, the NRC considered the potential impacts of a zirconium fire, even with the assurance that mitigating strategies are in place to prevent an offsite release from occurring for this highly unlikely beyond-design-basis event.

In addition to the three analyses performed by the NRC to support this rulemaking (ADAMS Accession No. ML16110A416), the NRC has previously conducted SFP studies, including NUREG-2161 and NUREG-1738, the conclusions of which support the technical basis for a graded approach to EP. Overall, these analyses: (1) demonstrate that a period of 10 hours provides sufficient time to implement mitigation measures for design-basis events at decommissioning sites, (2) provide a conservative basis for a spent fuel decay time beyond which the fuel in the SFP can reasonably be expected to take longer than 10 hours to heat up to ignition temperature, and (3) provide additional understanding of the amount of time available for taking action in response to beyond-design-basis events, including the margin of time that offsite agencies have to decide upon and initiate actions to protect public health and safety. The NRC applied these analyses and the considerations from previous studies of SFP risk to the planning basis elements from NUREG-0396 to develop the proposed regulations for EP at various levels during decommissioning.

## 2. Graded Approach for Emergency Preparedness

A graded approach to EP has a longstanding regulatory history. The 16 planning standards for operating reactors, outlined in § 50.47(b), and the associated evaluation criteria in NUREG-0654/FEMA-REP-1, Revision 1, “Criteria for Preparation and



Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,” issued November 1980 (ADAMS Accession No. ML040420012), are one part of a continuum of planning standards for radiological EP. The regulations in § 50.47(c)(2) for case-by-case EPZ size determinations; the EP regulations for research and test reactors and other non-power production or utilization facilities, fuel cycle facilities, and ISFSIs; and the EP considerations for small modular reactors and other new technologies (see “Rulemaking for Emergency Preparedness for Small Modular Reactors and Other New Technologies; Regulatory Basis” (ADAMS Accession No. ML17206A265)), are also part of a graded approach to EP that is commensurate with the relative radiological risk, source term, and potential hazards, among other considerations.

Consistent with the concept of a graded approach, the NRC is proposing four levels of emergency planning standards that coincide with the same milestones as the graded approach:

- Post-Shutdown Emergency Plan (PSEP) (Level 1)
- Permanently Defueled Emergency Plan (PDEP) (Level 2)
- ISFSI-Only Emergency Plan (IOEP) (Level 3)
- No emergency planning (Level 4)

In developing this proposed rule, the NRC considered the appropriateness of the EP requirements in 10 CFR part 50 and 10 CFR part 72 for decommissioning sites, including those requirements that have historically been addressed in approved exemptions and those that have not. The proposed planning standards within the levels are based on the current set of operating reactor EP standards informed by the analyses and considerations supporting a graded approach to EP as previously described, as well

as public comments on the ANPR and on the draft regulatory basis for this rulemaking. The NRC also considered the criteria of safety, implementation costs, efficiency, transparency, flexibility, and responsiveness. The following discussion describes the proposed graded approach to EP.

### **Post-Shutdown Emergency Plan**

For a decommissioning site, once all the fuel is in the SFP, the spectrum of accidents that can have significant offsite consequences is greatly reduced and is dominated by the highly unlikely occurrence of a zirconium fire. The primary consideration for the planning basis for a PSEP is the potential consequences and timing of this narrow spectrum of accidents in relation to the time needed to initiate protective actions.

From a regulatory perspective, the purpose of a PSEP is to provide a transition period in which to ensure that an appropriate level of EP is maintained onsite and offsite to respond to applicable DBAs and to ensure a prompt response to the highly unlikely rapid draindown of the SFP and subsequent zirconium fire and release occurring in less than 10 hours. A nuclear power reactor licensee would be permitted to transition to a PSEP after the NRC's docketing of the licensee's certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel pursuant to §§ 50.82 or 52.110. The NRC anticipates that licensees will maintain a PSEP from the date that the NRC docket the licensee's certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel, until the spent fuel has decayed for a period of at least 10 months (for BWRs) or 16 months (for PWRs) from the date of permanent cessation of operations, unless a different period is justified. During this time, the licensee would be relieved of the regulatory burden of requirements

that are not needed to support an appropriate level of EP as preparations are made to implement a PDEP. The PSEP is a transition period for both onsite and offsite emergency planning in which the regulatory requirements for periodic updates, reviews, and audits that were necessary to support operating reactor EP programs should not interfere with efforts to establish an appropriate level of EP for a PDEP. The NRC does not intend for many significant changes to occur to the emergency plan while the PSEP is used.

### **Permanently Defueled Emergency Plan**

For plants that have permanently shut down and defueled, the proposed EP approach is based primarily on conditions that: (1) a postulated radiological release would not exceed the EPA early-phase PAGs at the exclusion area boundary for DBAs applicable to a permanently shutdown and defueled reactor, and (2) sufficient time would exist to implement mitigative actions in response to a postulated zirconium fire beyond-design-basis accident scenario in the SFP and, if warranted, for offsite officials to initiate appropriate response actions to protect public health and safety. Because of the additional time available to take mitigative actions and, if necessary, to initiate protective actions, many requirements applicable under an operating reactor emergency plan or a PSEP would not be required to protect public health and safety and, therefore, would not be applicable to licensees with sufficiently decayed spent fuel under a PDEP.

The NRC is providing two regulatory alternatives to specify when the transition to a PDEP may occur: (1) after a specified amount of spent fuel decay time that starts from the date of permanent cessation of operations, or (2) after an alternative timeframe based on a site-specific analysis that shows that the fuel in the SFP cannot heat up to clad ignition temperature (900 degrees C) within 10 hours under adiabatic conditions. In

either case, a licensee would be permitted to transition to a PDEP only after the NRC's docketing of the licensee's certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel pursuant to § 50.82 or § 52.110. This proposed rule specifies an acceptable decay time in order to relieve licensees of the regulatory burden of providing a site-specific analysis. Licensees are provided the option to submit a site-specific analysis proposing an alternative decay period, but such an analysis would be subject to NRC review and approval before a transition to a PDEP.

### **Independent Spent Fuel Storage Installation Only Emergency Plan**

The third level of decommissioning under the proposed rule would occur when all spent fuel is removed from the SFP and placed in dry cask storage. At this point, the licensee would have an ISFSI-only emergency plan, or IOEP. A licensee with all of its spent fuel in dry cask storage that terminates its 10 CFR part 50 or 10 CFR part 52 license must first obtain a specific 10 CFR part 72 license. Accordingly, the licensee would then transition to the EP requirements for dry cask storage in § 72.32, "Emergency Plan." A licensee maintaining its 10 CFR part 50 or 10 CFR part 52 license may opt to change its EP program to align it with the requirements of § 72.32 once all spent fuel is transferred to dry cask storage. These two categories of licensees (i.e., 10 CFR part 72 specific licensees and 10 CFR part 50 or 10 CFR part 52 licensees with 10 CFR part 72 general licenses) would be permitted to adopt an IOEP, consistent with the EP requirements that currently exist under § 72.32(a).

## **All Spent Fuel Removed from Site**

Once all the spent fuel has been permanently removed from the site, a licensee can terminate its EP program because the site no longer poses any risk of a radiological release from the spent fuel.

### **3. Licensee Supporting Analyses**

Decommissioning nuclear power reactor licensees submitting requests for exemption from EP regulations have performed a series of supporting analyses for NRC review, as described in NSIR/DPR-ISG-02, "Interim Staff Guidance: Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants" (ADAMS Accession No. ML14106A057). To support the exemption requests, these analyses must demonstrate that: (1) any radiological release for applicable DBAs (e.g., fuel handling accident in the spent fuel storage facility, waste gas system release, and cask handling accident if the cask handling system is not licensed as single-failure-proof) would not exceed the limits of EPA PAGs at the exclusion area boundary, and (2) mitigation strategies and guidelines exist to provide an integrated response capability for beyond-design-basis events. In addition, licensees are required to demonstrate that, in the event of a complete loss of SFP water inventory with no heat loss (adiabatic heatup), a period of at least 10 hours would be available from the time all cooling is lost until any fuel cladding temperature reaches 900 degrees C.

Under this proposed rule, the NRC would not require licensees to submit these analyses to the NRC for review and approval (separately from existing NRC oversight processes described later in this document) or to certify that these analyses have been completed to support a change between EP levels. The NRC anticipates that a licensee would analyze applicable DBAs using the process under § 50.59 and reflect the analysis

in the licensee's updated FSAR. The NRC expects that licensees have developed and maintained mitigation strategies for beyond-design-basis events as required by NRC Order EA-12-049. For the heatup analysis, the NRC has already performed analyses of representative PWR and BWR spent fuel to determine the decay time necessary for the fuel to remain below clad ignition temperature for at least 10 hours assuming adiabatic heatup conditions. These analyses contain numerous conservatisms, such that the decay times specified in the rule would bound the decay time required for any plant to attain the 10-hour criterion. This particular analysis supports a transition to PDEP requirements, as previously described. The NRC is proposing an option to allow licensees to develop their own site-specific analysis for this transition time; however, licensees would need to submit such analyses to the NRC for review and approval. This proposed rule details that process.

The following sections describe the proposed EP planning standards and requirements for each graded level of EP (i.e., PSEP, PDEP, and IOEP) under proposed §§ 50.54(q) and 50.200, "Power reactor decommissioning emergency plans." The NRC is issuing draft Regulatory Guide (DG) DG-1346, "Emergency Planning for Decommissioning Nuclear Power Reactors" (ADAMS Accession No. ML17311B018), for public comment with this proposed rule that includes guidance on one method acceptable to the NRC for complying with these proposed regulations. This regulatory guide will supersede NSIR/DPR-ISG-02 upon publication of the final rule. This proposed rule contains a risk-informed, consequence-oriented, graded approach to EP for decommissioning sites that maintains the defense-in-depth philosophy and reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

#### 4. Post-Shutdown Emergency Plans

The NRC is proposing in § 50.54(q)(7) that a licensee can transition to a PSEP after the NRC's docketing of the licensee's certifications of permanent cessation of operations and permanent removal of all fuel from the reactor vessel pursuant to §§ 50.82(a)(1) or 52.110(a). A PSEP provides a transition period from the EP requirements for an operating reactor to the PSEP requirements under proposed § 50.200(b) and (c). The NRC is proposing regulations under new § 50.200(a) that would clarify how the planning standards in § 50.47(b) and requirements in appendix E to 10 CFR part 50 apply to a nuclear power reactor licensee's PSEP.

#### **PSEP Staffing and Emergency Response Organization**

Currently, the following regulations govern the staffing of the emergency response organization (ERO):

- Section 50.47(b)(1), which states, in part, "Primary responsibilities for emergency response by the nuclear facility...have been assigned...and each principal response organization has staff to respond and to augment its initial response on a continuous basis."
- Section 50.47(b)(2), which states, in part, "[A]dequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available..."
- Appendix E to 10 CFR part 50, paragraph IV.A, which states, in part, "The organization for coping with radiological emergencies shall be described, including definition of authorities, responsibilities, and duties of individuals assigned to the licensee's emergency organization...."

This proposed rule would allow a licensee transitioning to a PSEP to revisit staffing levels and the staffing analysis for the ERO performed under paragraph IV.A.9 of appendix E to 10 CFR part 50 to align staffing with the reduced spectrum of credible accidents for a permanently shutdown and defueled power reactor facility. The proposed requirement in § 50.200(a) would acknowledge that the spectrum of credible accidents requiring a response from the ERO at a facility that is permanently shutdown and defueled is reduced as compared to that for an operating plant. The principal public safety concern involves the potential radiological risks associated with the storage of spent fuel on site in the SFP. For example, the reactor, reactor coolant system, and reactor support systems are no longer in operation and have no function related to the storage of spent fuel. Therefore, postulated accidents involving a failure or malfunction of these systems are no longer applicable. As such, certain ERO positions and emergency functions as detailed in NUREG-0654/FEMA-REP-1, Revision 1, Table B-1, "Minimum Staffing Requirements for NRC Licensees for Nuclear Power Plant Emergencies," may not be applicable or necessary under a PSEP. Commensurate with the reduced spectrum of credible accidents, proposed § 50.200(a) would allow licensees to change ERO staffing levels required by existing § 50.47(b)(2) within their PSEPs. Reductions in facility staffing may be made as long as the facility operates with no loss of necessary EP functions and the reductions have no impact on the formal offsite radiological emergency response plans that are in effect. In conjunction with this proposed rule, the NRC is issuing for public comment DG-1346, which provides guidance on ERO capabilities to be maintained at facilities with PSEPs when reducing staffing levels.



## **PSEP Emergency Action Levels**

Currently, appendix E to 10 CFR part 50, paragraph IV.C requires licensees to develop a set of emergency action levels (EALs) based not only on onsite and offsite radiation monitoring information but also on readings from a number of sensors that indicate a potential emergency, such as the pressure in containment and the response of the emergency core cooling system. This proposed rule would allow licensees transitioning to a PSEP to revise EALs consistent with the profile of a permanently shutdown and defueled power reactor facility. Proposed § 50.54(q)(8)(iii) would state that changes to EALs resulting from changes in plant conditions due to the transition to decommissioning would not be reductions in effectiveness provided that the evaluation under § 50.54(q)(3) demonstrates that the changes do not reduce the capability of the licensee to take timely and appropriate protective actions. Given the defueled nature of facilities in decommissioning, EALs associated with power reactor operations (e.g., reactor vessel water level, core temperature, and containment radiation levels) and EALs for mitigation systems not associated with the SFP would no longer contain applicable initiating conditions. Containment parameters do not indicate the conditions relevant to EP at a defueled facility, and emergency core cooling systems would no longer be required. Other indications such as SFP level or temperature can be used at sites that have spent fuel in the SFPs. Consistent with existing requirements, licensees transitioning to a PSEP would still be required to maintain a set of EALs based on onsite radiation monitoring information and in-plant conditions and instrumentation applicable to EP for a defueled reactor.

Guidance document NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors" (ADAMS Accession No. ML12326A805), provides EALs for non-passive operating nuclear power reactors, permanently defueled reactors,

and ISFSIs. The NRC found NEI 99-01, Revision 6, acceptable for use in a letter dated March 28, 2013 (ADAMS Accession No. ML12346A463). To accompany this proposed rule, the NRC drafted guidance in Attachment 1 of Appendix A in DG-1346, for a permanently shutdown and defueled power reactor facility desiring to make an EAL scheme change. Notwithstanding the proposed changes to § 50.54(q), a licensee desiring to change its entire EAL scheme must receive prior NRC approval in accordance with appendix E to 10 CFR part 50, paragraph IV.B.2.

### **PSEP Evacuation Time Estimate Studies**

Appendix E to 10 CFR part 50, paragraph IV.3 requires licensees to use evacuation time estimates (ETEs) in the formulation of protective action recommendations (PARs) and to provide the ETEs to State and local governmental authorities for use in developing offsite protective action strategies. Licensees must update ETEs on a periodic basis in accordance with the requirements in § 50.47(b)(10) and appendix E to 10 CFR part 50, paragraphs IV.4, IV.5, and IV.6. The NRC is proposing to add a new paragraph IV.8 to appendix E to 10 CFR part 50 to clarify that the ETE requirements of paragraphs IV.4, IV.5, and IV.6 would no longer be applicable to licensees after permanent cessation of operations and permanent removal of fuel from the reactor vessel. Existing ETE analyses would remain effective within the emergency plan until no longer required for licensees with PDEPs.

Under proposed § 50.54(q)(7)(ii), a licensee transitioning to a PSEP would need to maintain a PSEP from the date that the NRC docket the licensee's certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel, until the spent fuel has decayed for a period of at least 10 months (for BWRs) or 16 months (for PWRs) from the date of permanent cessation of operations, unless an

alternative spent fuel decay period is proposed by the licensee and approved by the NRC. Updates to the ETE during this level of decommissioning would provide limited benefit for the enhancement of protective action strategies or offsite evacuation planning. Even if the criteria for updating the ETE analysis were met within the timeframe for a PSEP, updating an ETE report may take several months of analysis. After the ETE is updated, the regulations in appendix E to 10 CFR part 50, paragraph IV.6 require an additional 180 days before an updated ETE can be used to inform PARs and offsite protective action strategies. The additional time and effort needed to develop and implement a revised protective action strategy may exceed the time that a facility would spend with a PSEP before transitioning to a PDEP. Based on the NRC's review of submitted ETEs, population changes within a period comparable to the post-shutdown timeframe are unlikely to impact ETEs enough to affect the formulation of protective action strategies. In addition, because licensees with PDEPs would not be required to have preplanned PARs to provide for a prompt response to a radiological emergency, updates to the ETE post-shutdown would provide no significant benefit.

### **PSEP Annual Dissemination of Public Information**

Appendix E to 10 CFR part 50, paragraph IV.D.2 currently requires licensees to make an annual dissemination of basic emergency planning information to the public within the plume exposure pathway EPZ. Section II.G of NUREG-0654/FEMA-REP-1, Revision 1, contains criteria for the information that should be included in the annual dissemination of public information, including educational information on radiation, points of contact, protective measures, and information for special needs populations. The NRC is not proposing changes related to the requirement for an annual dissemination of

public information for a PSEP because the change in the plant's operating status and the ensuing changes to the EP program would be appropriate information to communicate to the public. However, consistent with the removal of regulatory standards for offsite radiological emergency plans for decommissioning sites (including the removal of EPZ requirements) as discussed later in this document, licensees with PDEPs would not be required to provide annual disseminations of information to the public. In DG-1346, the NRC provides guidance on one method acceptable to the NRC for a final dissemination of information to the public for licensees with PSEPs.

### **PSEP Hostile Action**

In the 2011 final rule, "Enhancements to Emergency Preparedness Regulations" (76 FR 72559; November 23, 2011) (2011 EP Final Rule), the NRC amended its regulations to include enhancements to EP in response to a hostile action event. Appendix E to 10 CFR part 50, paragraph IV.A.7 defines "hostile action" as an act directed toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. Appendix E to 10 CFR part 50, paragraph IV.B.1 requires nuclear power reactor licensees to have EALs for hostile action, paragraph IV.E.8.d requires nuclear power reactor licensees to have alternative facilities that would be accessible even if the site is under threat of or experiencing hostile action for the staging of ERO personnel, paragraph IV.I requires nuclear power reactor licensees to develop protective actions to protect onsite personnel during hostile action, and paragraph IV.F.2.c.4 and paragraph IV.F.2.i require nuclear power reactor licensees to have hostile action scenarios in drills and exercises. These EP requirements related to hostile action are

separate and distinct from the physical protection regulations in 10 CFR part 73, “Physical Protection of Plants and Materials.”

The NRC is proposing to maintain EP requirements related to hostile action for power reactor licensees transitioning to a PSEP but concludes that continuing with full-participation hostile-action-based exercises would provide limited safety benefit to a licensee that is decommissioning its facility. Once the NRC docket the licensee’s certifications required under § 50.82(a)(1) or § 52.110(a), proposed appendix E to 10 CFR part 50, paragraph IV.F.2.k would allow a licensee to follow the requirements of proposed § 50.200(c)(1)(vi). Section 50.200(c)(1)(vi) would remove the hostile-action-based exercise requirement from the 8-year exercise cycle, although security-based EALs would remain in place as potential initiating events.

This proposed rule would largely maintain the EP requirements related to hostile action for licensees with PSEPs because spent fuel at a power reactor facility that has a PSEP has not yet undergone a significant period of decay, necessitating the maintenance of formal offsite radiological emergency planning. The potential consequences and timing of an accident are the primary considerations for the EP planning basis at power reactor facilities transitioning to a PSEP. Although NUREG-1738 did not evaluate the potential consequences of a sabotage event that could directly cause offsite fission production dispersion, the NRC did study the potential consequences of the zirconium fire event at different spent fuel decay times. Within the timeframe proposed for power reactor facilities transitioning to a PSEP, the study in NUREG-1738 shows that decay time is significant when considering short-term radiological consequences. Additionally, maintaining EP requirements related to hostile action during this transitional (and time-limited) level of decommissioning would help

both the licensee and offsite response organizations (OROs) avoid immediate significant changes to the onsite and offsite emergency plans.

### **PSEP Drills and Exercises**

Current regulations in appendix E to 10 CFR part 50, paragraph IV.F and § 50.47(b)(14) include requirements for periodic drills and exercises for nuclear power reactor licensees. Under proposed appendix E to 10 CFR part 50, paragraphs IV.F.2.k, and proposed § 50.200(c)(1)(vi), the NRC would define drill and exercise requirements for power reactor facilities under a PSEP. Beginning with a PSEP, exercise scenarios would be reduced commensurate with the permanent cessation of operations and permanent removal of fuel from the reactor vessel to reflect a smaller suite of potential accident scenarios. Proposed paragraph IV.F.2.k would allow licensees to follow the biennial exercise requirements of proposed § 50.200(c) once the NRC docket the licensee's certifications required under § 50.82(a)(1) or § 52.110(a) (see "*PSEP Drills and Exercises*" section in this document for discussion of drill and exercise requirements under § 50.200(c)(1)(vi)).

Current regulations in appendix E to 10 CFR part 50, paragraph IV.F.2.c also require that offsite radiological emergency plans for each site be exercised biennially with full participation by each offsite authority having a role under the radiological emergency plan. Paragraph IV.F.2.k and proposed § 50.200(c)(1)(vi) would also provide that biennial exercises of offsite emergency plans would no longer be required after the NRC docket a licensee's certifications under § 50.82(a)(1) or § 52.110(a) for each of the licensee's reactors at the site. However, a licensee would still be required to exercise offsite plans under paragraph IV.F.2.c as long as there is an operating reactor at the site.

Because the risk of an accident resulting in an offsite radiological release significantly decreases during decommissioning, and because regulatory standards for offsite radiological EP programs would not be a requirement under a PDEP, there would be limited safety benefit to performing full-scale participation exercises simulating a release with offsite consequences while a licensee maintains a PSEP. Although exercises of offsite plans would no longer be required for facilities during decommissioning, proposed § 50.200(c)(1)(vi) would require, within two years of the NRC's docketing of the licensee's certifications required under § 50.82(a)(1) or § 52.110(a), each licensee to conduct an exercise of its onsite emergency plan, followed by subsequent exercises of its onsite emergency plan every two years.

### **PSEP Emergency Response Data Systems**

Appendix E to 10 CFR part 50, section VI, "Emergency Response Data System," outlines a set of system, testing, and implementation requirements for the emergency response data system (ERDS). These systems transmit near-real-time electronic data directly between the licensee's onsite computer system and the NRC Operations Center. Nuclear power facilities that are shutdown permanently or indefinitely are currently not required to provide hardware to interface with the NRC receiving system under appendix E to 10 CFR part 50, paragraph VI.2, and the NRC is not proposing any regulatory changes to section VI beyond minor corrections (see "*Cleanup of Regulations*" section in this document). Under § 50.72, "Immediate notification requirements for operating nuclear power reactors," licensees with PSEPs would maintain a capability to provide meteorological, radiological, and SFP data (e.g., level, flow, and temperature data) to the NRC within a reasonable timeframe following an event.

## 5. Permanently Defueled Emergency Plans

Proposed § 50.54(q)(7)(ii) describes the timeframe after which a licensee would be permitted to transition to a PDEP. As discussed in the “*Technical Basis for Graded Approach*” section of this document, the NRC concluded that after a decay period of 10 months (for BWRs) or 16 months (for PWRs), the spent fuel cannot reasonably heat up to clad ignition temperature within 10 hours. Therefore, the NRC is proposing that a licensee can transition to a PDEP after the NRC’s docketing of the licensee’s certifications of permanent cessation of operations and permanent removal of all fuel from the reactor vessel pursuant to §§ 50.82(a)(1) or 52.110(a) and when at least 10 months (for BWR) or 16 months (for PWR) have elapsed since the date of permanent cessation of operations.

Proposed § 50.54(q)(7)(ii) would also allow licensees to submit an analysis for NRC approval demonstrating that an alternative spent fuel decay period would ensure that spent fuel would not heat up to 900 degrees C in less than 10 hours under adiabatic conditions. Under the proposed rule, licensees would be required to submit this analysis under § 50.90 and the analysis would need to be approved by the NRC in order for a licensee to transition to a PDEP in less than 10 months (for a BWR) or 16 months (for a PWR). While the NRC’s research conducted to inform this proposed rule supports a required decay period of 10 months (for BWRs) or 16 months (for PWRs), it is possible that a licensee may be able to demonstrate, based on site-specific conditions, that a shorter decay period would still ensure that spent fuel cannot reasonably heat up to clad ignition temperature within 10 hours; therefore, the NRC is allowing for the flexibility to submit an alternate decay period under proposed § 50.54(q)(7)(ii). The NRC is issuing



DG-1346 for public comment in conjunction with this proposed rule; DG-1346 provides one method acceptable to the NRC for conducting the spent fuel heatup analysis.

As demonstrated in the results of the NRC's task analysis of mitigation actions, "A Human Reliability Analysis of the Spent Fuel in the Spent Fuel Pool of Decommissioning Nuclear Plants" (ADAMS Accession No. ML16110A432), a period of 10 hours will provide sufficient time for plant staff to implement mitigation strategies to prevent spent fuel heatup damage. Additionally, as noted in the NRC's analysis, "Offsite Dose Accumulation Rates Following a Hypothetical Spent Fuel Pool Accident" (ADAMS Accession No. ML16110A430), even in the event of a highly unlikely beyond-design-basis accident leading to a rapid draindown of the SFP and subsequent zirconium fire, there may be an additional time margin of several hours beyond the 10-hour heatup time during which protective actions can be taken to protect the public before the dose levels associated with EPA PAGs would be exceeded off site. Because of the additional time available to take mitigation actions and, if necessary, to initiate protective actions, many requirements applicable to licensees with PSEPs would not be applicable to licensees with sufficiently decayed spent fuel (i.e., licensees with PDEPs). The following discussion addresses the planning standards under proposed § 50.200(b) and requirements under proposed § 50.200(c) that would be necessary to adequately protect public health and safety at facilities with PDEPs. The proposed requirements for facilities with PDEPs are consistent with the guidance contained in NSIR/DPR-ISG-02.

### **Offsite Radiological Emergency Response Plans**

Currently, § 50.47(b) applies to both onsite and offsite radiological emergency response plans, and appendix E to 10 CFR part 50 includes requirements for emergency plans to address offsite emergency response capabilities (e.g., public alert and

notification systems, offsite PAR development, ETEs, exercises of offsite emergency plans). Under this proposed rule, NRC planning standards would no longer be applied to offsite radiological emergency response plans for plants with PDEPs.

In its review of several exemption requests, the NRC concluded that as long as a period of at least 10 hours is available to implement mitigation measures or initiate appropriate response actions off site, formal offsite radiological emergency plans, required under 10 CFR part 50, are not necessary for permanently shutdown and defueled nuclear power reactor licensees with a PDEP. In a hypothetical SFP accident scenario, 10 hours is a conservative estimate of the amount of time available to implement mitigation measures or to take other appropriate response actions. The 10 hours assumes that the spent fuel begins to heat up immediately after the initiating event occurs and does not include the expected amount of time it would take for water to drain from the pool. A beyond-design-basis accident that results in the water draining from the pool (whether a full or partial draindown) would likely take much longer than 10 hours because of the robust construction of the SFP and the large volume of water in the SFP, delaying the onset of heatup. Additionally, 10 hours is a conservative period of time during which preplanned mitigation measures to provide makeup water or spray to the SFP can be implemented reliably before the onset of a zirconium cladding ignition.

If a release is projected to occur, 10 hours would be sufficient time for licensees to notify offsite agencies and for these agencies to initiate appropriate action to protect public health and safety. The NRC concludes that 10 hours provides ample time to take appropriate actions without the extensive preplanning and other requirements of the EP framework for operating plants, and, therefore, regulatory standards for offsite radiological emergency plans would no longer be necessary for the adequate protection of public health and safety. Licensees with PDEPs would still maintain a variety of

onsite capabilities that may be available to support OROs in EP and response, including radiological training; regular coordination with OROs; radiological assessment capabilities; memoranda of understanding for firefighting, law enforcement, and ambulance/medical services; and the ability to make PARs upon request. For licensees with PDEPs, no action would be expected or required from State or local government organizations in response to an event at a decommissioning site other than firefighting, law enforcement, and ambulance/medical services. Requirements for licensees to maintain agreements for these services also exist outside of radiological EP, including the requirement for licensees to maintain a fire protection plan in § 50.48, “Fire protection,” and physical security requirements in 10 CFR part 73. Since the requirements of § 50.47(b) continue to apply to offsite radiological emergency plans during decommissioning, the NRC is proposing to add § 50.47(f) to clarify when the 16 planning standards in § 50.47(b) no longer apply to offsite radiological emergency plans.

### **PDEP Staffing and Emergency Response Organization**

Currently, § 50.47(b)(1) and (2) and paragraph IV.A of appendix E to 10 CFR part 50 require licensees to maintain adequate staffing for initial and augmented response in the case of an emergency and to describe ERO responsibilities in their emergency plans. Further, appendix E to 10 CFR part 50, paragraph IV.A.9 requires licensees to conduct a detailed staffing analysis demonstrating that on-shift personnel assigned emergency plan implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions as specified in the emergency plan.

Proposed § 50.200(b)(1), (b)(2), and (c)(1)(i) would include similar staffing requirements for licensees with PDEPs, with the exception of changes made to reflect

the small staffing levels required at a decommissioning facility and the removal of formal offsite radiological emergency response requirements for licensees with PDEPs. For example, licensees with PDEPs would not have to comply with the requirement under appendix E to 10 CFR part 50, paragraph IV.A.3 to augment the ERO with staff from licensee headquarters. Because of the much lower risk and much slower progression of events as compared to operating plants, decommissioning sites typically have a level of emergency response that does not require response by headquarters personnel. Licensees would not have to identify State and/or local officials responsible for protective actions, as currently required under appendix E to 10 CFR part 50, paragraph IV.A.8 because offsite emergency measures are limited to onsite support provided by local police, fire departments, and ambulance and hospital services, as appropriate. Proposed § 50.200(c)(1)(i) would require licensees with PDEPs to include in their emergency plans plant staff emergency assignments.

In addition, the staffing analysis required under appendix E to 10 CFR part 50, paragraph IV.A.9 would no longer apply to licensees with PDEPs. In the 2011 EP Final Rule, the NRC concluded that the staffing analysis requirement was not necessary for non-power reactor licensees because of the small staffing levels required for those facilities. For this same reason, licensees with PDEPs would no longer be required to perform this analysis under the proposed rule.

As licensees transition to a PDEP, staffing levels may be reduced but must remain commensurate with the need to safely store spent fuel at the facility in a manner that is protective of public health and safety. The NRC is issuing DG-1346 for public comment in conjunction with this proposed rule; DG-1346 provides guidance on ERO staffing levels for a PDEP. Licensees with PDEPs would need to be able to augment on-shift capabilities within two hours after declaration of an emergency. The augmented

staff would need to include engineering capability appropriate for SFP accident mitigation, but may otherwise be reduced.

Currently, a licensee is required to maintain staffing levels at its technical support center (TSC), operational support center (OSC), and emergency operations facility (EOF). In accordance with NUREG-0696, "Functional Criteria for Emergency Response Facilities" (ADAMS Accession No. ML051390358), a TSC is an onsite facility located close to the control room that provides plant management and technical support to the reactor operating personnel located in the control room during emergency conditions; the OSC is an onsite area separate from the control room and the TSC where licensee operations support personnel will assemble in an emergency; and an EOF is an offsite support facility for the management of overall licensee emergency response (including coordination with Federal, State, and local officials), coordination of radiological and environmental assessments, and determination of recommended public protective actions. Because of the low probability of DBAs or other credible events that would be expected to exceed the EPA PAGs off site and the available time to implement mitigation measures consistent with plant conditions and, if necessary, to initiate response actions, licensees with PDEPs would not need to maintain the TSC, OSC, and EOF designated staff or dedicated offsite dose assessment field teams.

### **PDEP Emergency Classification Levels and Emergency Action Levels**

Currently, § 50.47(b)(4) and appendix E to 10 CFR part 50, paragraphs IV.B and IV.C specify the EAL and emergency classification level (ECL) requirements for operating reactors. Similar to § 50.47(b)(4), the proposed PDEP planning standard under § 50.200(b)(4) would require licensees with PDEPs to establish a standard ECL and EAL scheme, the bases of which would include facility system and effluent

parameters. The NRC is proposing EAL and ECL requirements for licensees with PDEPs that are analogous to appendix E to 10 CFR part 50, paragraphs IV.B and IV.C with the exceptions of the requirements to base EALs on offsite monitoring information and the appendix E to 10 CFR part 50 paragraph IV.B.1 requirement to include hostile action-based EALs. Because licensees with PDEPs would not be required to maintain formal offsite radiological emergency response plans and “hostile action” does not apply (see discussion in “*PDEP Hostile Action*” and “*Offsite Radiological Emergency Response Plans*” sections in this document), these requirements are no longer relevant to these facilities. However, EALs for security-based events would still be required.

Under proposed § 50.200(c)(1)(ii)(A), licensees with PDEPs would continue to be required to describe in their emergency plans the EALs that are used as a criterion for determining the need for notification and participation of governmental agencies and the EALs that are used for determining when and what protective measures should be considered within the site boundary to protect public health and safety. In addition, licensees with PDEPs would be required to review EALs with State and local governmental authorities on an annual basis. Under proposed § 50.200(c)(1)(iii)(A), licensees with PDEPs would continue to be required to describe in their emergency plans the spectrum of emergency conditions that involve the alerting or activating of the total emergency organization, the communication steps to be taken to alert or activate personnel, EALs for notification of offsite agencies, and the existence of a message authentication scheme. Under proposed § 50.200(c)(1)(ii)(B), a licensee desiring to make an EAL scheme change as part of the PDEP must follow the requirements of appendix E to 10 CFR part 50, paragraph IV.B.2.

For facilities with PDEPs, proposed § 50.200(c)(1)(iii)(A) would specify that only the ECLs of Notification of Unusual Event and Alert would apply (and not the ECLs of

Site Area Emergency and General Emergency, which apply to operating reactors). For these facilities, the probability of a condition reaching the level above an emergency classification of Alert is very low. In the event of an accident at a facility with a PDEP, time will be available to implement mitigation measures consistent with plant conditions. As stated in NUREG-1738, small SFP leaks or loss of cooling scenarios evolve very slowly and generally leave many days for recovery efforts. Offsite radiation monitoring would be performed as the need arises. Because of the low probability of DBAs or other credible events that would reasonably be expected to exceed the EPA PAGs and the available time to implement mitigation measures consistent with plant conditions and, if necessary, to initiate appropriate response actions off site, facilities with PDEPs would not require declarations of Site Area Emergency and General Emergency and the associated offsite radiation monitoring systems. The results from the NRC's analyses previously discussed support this conclusion.

Consistent with the discussion on PSEPs, EALs for power reactor operations (e.g., reactor vessel water level, core temperature, and containment radiation levels) and EALs related to mitigation systems not associated with the SFP would no longer be applicable for facilities with PDEPs. The NRC is issuing DG-1346 for public comment in conjunction with this proposed rule; DG-1346 provides one method acceptable to the NRC for EALs for facilities with PDEPs. As discussed previously, proposed § 50.54(q)(8)(iii) describes requirements for decommissioning licensees to conduct reduction in effectiveness determinations for EAL schemes.

### **PDEP Emergency Assessment, Classification, and Declaration**

Currently, appendix E to 10 CFR part 50, paragraph IV.C.2 requires licensees to maintain the capability to assess, classify, and declare an emergency condition within

15 minutes. A decommissioning power reactor has a low likelihood of a design-basis accident or other credible event resulting in radiological releases requiring offsite protective measures, and the event progression is much slower compared to that for operating reactors. For these reasons, under this proposed rule licensees with PDEPs would not be required to assess, classify, and declare an emergency condition within 15 minutes. Instead, the NRC is proposing under § 50.200(c)(1)(iii)(B) that licensees with PDEPs must document and maintain the capability to assess, classify, and declare an emergency condition as soon as possible and within 60 minutes after the availability of indications that an EAL has been exceeded and must promptly declare the emergency condition as soon as possible following identification of the appropriate ECL. Similar to the requirements in appendix E to 10 CFR part 50, paragraph IV.C, proposed § 50.200(c)(1)(iii)(B) would clarify that PDEP licensees must not treat the timeframe as a grace period or delay the implementation of response actions. The 60-minute timeframe is commensurate with the slower progression of a credible event resulting in a radiological release requiring offsite protective measures (see discussion of the timeframe for potential releases and mitigation actions at decommissioning sites in the section “*Permanently Defueled Emergency Plans*” in this document).

#### **PDEP Notification Requirement to State and Local Governmental Agencies**

Currently, appendix E to 10 CFR part 50, paragraph IV.D.3 requires licensees to have the capability to notify OROs of an emergency declaration within 15 minutes. Under proposed § 50.200(c)(1)(iv)(B), licensees with PDEPs would be required to promptly notify State and local governmental agencies and to make this notification as soon as possible and within 60 minutes after declaring an emergency. The NRC’s research and analysis shows that licensees with PDEPs would have sufficient time to



implement mitigation measures consistent with plant conditions and, if necessary, for OROs to initiate protective actions offsite. Notifying OROs as soon as possible and within 60 minutes would not significantly impact the time available for OROs to initiate appropriate response actions.

### **PDEP Public Alert and Notification Systems**

Currently, appendix E to 10 CFR part 50, paragraph IV.D.3 requires licensees to demonstrate that appropriate governmental authorities have the capability to make a public alerting and notification decision promptly on being informed of an emergency condition. Because of the low probability of DBAs or other credible events that would be expected to exceed the limits of EPA PAGs offsite and the available time for event mitigation, under this proposed rule, the public alert and notification system specified in appendix E to 10 CFR part 50, paragraph IV.D.3 would not be required for licensees with PDEPs. Similarly, exercises of this system, as required under appendix E to 10 CFR part 50, paragraph IV.F.2, would no longer be required for licensees with PDEPs. As previously discussed, licensees with PDEPs would still be required to maintain the capability to notify responsible State and local governmental agencies within 60 minutes after declaring an emergency, and, based on its research and analysis showing that there would be at least 10 hours prior to a zirconium fire for licensees with PDEPs, sufficient time would be available for appropriate governmental authorities to inform the public and initiate protective actions, if necessary. Such actions would be within the capabilities of offsite response organizations and would be similar to actions required for other hazards that do not require a dedicated hazard-specific offsite response capability as is the case for operating reactors.

## **PDEP Emergency Planning Zones**

Currently, § 50.47(b) and (c)(2) require licensees to conduct emergency planning for both the shorter term plume exposure pathway EPZ (generally 10 miles) and the longer term ingestion exposure pathway EPZ (generally 50 miles). Appendix E to 10 CFR part 50 contains additional emergency planning requirements for these two types of EPZs. However, the maintenance of the plume exposure pathway and ingestion exposure pathway EPZs for licensees with PDEPs is not warranted because of the low probability of DBAs or other credible events that would be expected to exceed the EPA PAGs off site and the available time to implement mitigation measures. Additionally, if necessary, sufficient time would be available for OROs to initiate appropriate response actions even for a highly unlikely severe accident. Therefore, consistent with the NRC's determination to not require the establishment of formal offsite radiological emergency response plans for licensees with PDEPs, the NRC is proposing to eliminate the requirements that EPZs be maintained for licensees with PDEPs. In other words, the plume exposure pathway EPZ for licensees with PDEPs does not exceed the site area boundary. Consequently, the planning standards for PDEPs under proposed § 50.200(b) and the requirements under proposed § 50.200(c) do not include references to the EPZs.

The NRC is also proposing to add a new paragraph (f) to § 50.47 that would clarify that the planning standards of § 50.47(b) do not apply to offsite radiological emergency response plans if the licensee's emergency plan is not required to meet these planning standards or if the plume exposure pathway EPZ does not exceed the site area boundary.

## **PDEP Offsite Radiological Protective Action Recommendations**

Currently, § 50.47(b) requires licensees to develop a range of protective actions for the plume exposure pathway EPZ for emergency workers and the public and to give consideration to evacuation, sheltering, and the use of potassium iodide. Licensees also must develop and put in place guidelines for the choice of protective actions during an emergency and develop protective actions for the ingestion exposure pathway EPZ. Proposed § 50.200(b)(10) would require licensees with PDEPs to continue to develop a range of protective actions for emergency workers and the public but, consistent with the removal of regulatory standards for offsite radiological EP for these licensees, would not reference specific offsite protective actions or pre-planned activities for the public in the EPZs. The proposed requirement would call for protective actions directed at emergency workers who may have to respond to the decommissioning site for firefighting, law enforcement, and ambulance/medical services and members of the public present within the owner-controlled area during a radiological emergency.

For licensees with PDEPs, pre-planned offsite protective actions to ensure a prompt response to a radiological emergency on site are not necessary given the time available for OROs to initiate appropriate response actions. Although the likelihood is low for events that would result in doses in excess of the EPA PAGs to the public beyond the owner-controlled area boundary based on the permanently shutdown and defueled status of the reactor, the proposed rule would require licensees with PDEPs to determine the magnitude of and continually assess the impact of a radiological release under proposed § 50.200(c)(1)(ii)(A), and, if a release is occurring, the licensee would be required to communicate that information to offsite authorities as soon as possible for their consideration in taking appropriate response actions under proposed § 50.200(c)(1)(iv)(B).

In 2001, the NRC revised its EP regulations through the “Consideration of Potassium Iodide in Emergency Plans” (66 FR 5427; January 19, 2001) final rule to include the consideration of potassium iodide as a protective measure for the general public to supplement sheltering and evacuation in the unlikely event of a severe nuclear power plant accident. For licensees with PDEPs, in addition to not needing pre-planned protective action strategies, the iodine in the spent fuel has decayed sufficiently such that there is no need to consider a supplemental potassium iodide program.

### **PDEP Evacuation Time Estimate Studies**

Currently, licensees are required to develop and update ETEs in accordance with the requirements in § 50.47(b) and appendix E to 10 CFR part 50, paragraph IV.3. Paragraph IV.3 requires licensees to use ETEs in the formulation of PARs and to provide ETEs to State and local governmental authorities for use in developing offsite protective action strategies. Because of the low probability of DBAs or other credible events that would be expected to exceed the limits of EPA PAGs offsite and the available time for event mitigation, as well as the minimal expected offsite response required, the proposed rule would not require licensees with PDEPs to maintain ETEs (see section “*PSEP Evacuation Time Estimate Studies*” in this document for additional discussion regarding the need for ETEs post-shutdown).

### **PDEP Emergency Facilities and Equipment**

Currently, appendix E to 10 CFR part 50, paragraph IV.E requires licensees to maintain and describe adequate provisions for emergency facilities and equipment, including equipment at the site for personnel monitoring, equipment for radiological assessment, facilities and supplies for decontaminating onsite individuals, first aid

facilities and medical supplies, arrangements for qualified medical service providers and the transportation of contaminated injured individuals, and arrangements for the treatment of individuals injured in support of licensed activities. Decommissioning licensees have not received exemptions or license amendments for these requirements to date, and the NRC has determined that licensees with PSEPs and PDEPs would still need to maintain these capabilities under proposed § 50.200(c)(1)(v). Appendix E to 10 CFR part 50, paragraph VI.E.8 further includes emergency response facility requirements for a TSC, OSC, and EOF.

For licensees with PDEPs, there is no longer a need for separate, dedicated facilities. The functions of the control room, TSC, OSC, and EOF could be combined into one or more locations while still adequately protecting public health and safety. Proposed § 50.200(c)(1)(v)(H) would require licensees with PDEPs to establish a facility from which effective direction can be given and effective control can be exercised during an emergency. Because of the low probability of DBAs or other credible events that would be expected to exceed the limits of EPA PAGs offsite and the available time for event mitigation, the significantly reduced staff, and the minimal expected response required, offsite response would not be required at an EOF. Onsite actions may be directed from the control room or other location, without the requirements imposed on a TSC or EOF. Proposed § 50.200(b)(3) would remove reference to the EOF as a location for response. Additionally, under this proposed rule, a separate OSC would no longer be required to meet its original purpose of an assembly area for plant logistical support during an emergency. The OSC function could be incorporated into another facility. The NRC is issuing DG-1346 for public comment in conjunction with this proposed rule; DG-1346 provides one acceptable method for meeting the proposed emergency response facility requirements for PDEPs.

Appendix E to 10 CFR part 50, paragraph IV.E.9 addresses requirements for emergency communications systems, plans, and arrangements, including communications with OROs and between the control room, TSC, and EOF. Proposed § 50.200(c)(1)(v)(I) would require licensees with PDEPs to continue to maintain an onsite and an offsite communications system with backup power and communication plans with arrangements for emergencies. These arrangements would need to include provisions for communications with contiguous State and local governments, Federal emergency response organizations, NRC Headquarters, and the appropriate NRC Regional Office Operations Center. Because licensees with PDEPs may combine emergency response facilities, the current requirements for communication between emergency response facilities would not apply to these licensees. Under the proposed rule, communications with State and local emergency operations centers would be maintained to allow coordination of assistance on site if required.

### **PDEP Hostile Action**

Under this proposed rule, hostile action requirements would not apply to licensees with PDEPs. The definition of “hostile action” in appendix E to 10 CFR part 50, paragraph IV.A.7 applies here to the capability of implementing EP during hostile action events. However, in the statement of considerations (SOC) for the 2011 EP Final Rule, the NRC excluded non-power reactors from the definition of “hostile action” because a non-power reactor as defined in § 50.2, “Definitions,” is not a nuclear power plant, and a regulatory basis had not been developed to support the inclusion of non-power reactors in the definition of “hostile action.” A licensee with a PDEP would be similar to a non-power reactor in that both have a low likelihood of a credible accident resulting in radiological releases requiring response actions off site. Additionally,

regardless of how a disruption to the SFP cooling occurs, the spent fuel would take longer than 10 hours to heat up to ignition temperature, providing adequate time to coordinate a response between the ERO and law enforcement officials. As such, licensees with PDEPs would not fall within the scope of “hostile action,” and enhancements to EP in response to hostile action, such as alternative facilities for the staging of ERO personnel, protection of onsite personnel, and challenging drills and exercises involving hostile action, would not be warranted.

Although this rationale justifies the exclusion of licensees with PDEPs from the definition of “hostile action” and its related requirements (including conducting hostile action exercises) as they apply to EP, elements for security-based events would still be maintained for these facilities, including EALs for security-based events. Under the proposed rule, licensees with PDEPs would be required to identify ORO resources that would respond to a security event, and the assistance licensees expect from those resources would be maintained in PDEPs. For physical security, the objective for these facilities relates to protection of the spent fuel against sabotage. A level of security commensurate with the consequences of a sabotage event is required and is evaluated on a site-specific basis. The severity of the consequences declines as fuel ages and thereby removes over time the underlying concern that a sabotage attack, under the current definition, could cause offsite radiological consequences.

### **PDEP Drills and Exercises**

Section 50.47(b)(14) and appendix E to 10 CFR part 50, paragraph IV.F provide training and drill and exercise requirements for nuclear power reactor licensees.

Consistent with the language of § 50.47(b)(14), the proposed PDEP planning standard under § 50.200(b)(14) would require licensees with PDEPs to conduct periodic exercises

to evaluate major portions of emergency response capabilities, conduct periodic drills to develop and maintain key skills, and correct deficiencies identified as a result of exercises and drills. The NRC is proposing new drill and exercise requirements for licensees with PDEPs under § 50.200(c)(1)(vi) that differ from the existing requirements under appendix E to 10 CFR part 50, paragraph IV.F to account for changes in principal functional areas, offsite radiological emergency response requirements, offsite PAR requirements, and the spectrum of possible accidents.

Similar to the requirements in appendix E to 10 CFR part 50, paragraph IV.F.1, proposed § 50.200(c)(1)(vi)(A) would require licensees with PDEPs to describe in their emergency plan provisions for the training of employees, exercising the emergency plan by conducting periodic drills, and including other individuals in training and drills when those individuals may provide assistance in the event of a radiological emergency. Under the proposed rule, the emergency plan would need to describe the training to be provided to several categories of emergency personnel, with the exception of licensees' headquarters support personnel. Headquarters support personnel would no longer be required to augment the ERO for licensees with PDEPs. Licensees with PDEPs would need to continue to make available a radiological orientation training program for local services personnel expected to provide support onsite. Because of the time available to coordinate offsite agency notification to the public, licensees with PDEPs would not be required to provide radiological orientation training to local news media persons. Similar to the requirements in appendix E to 10 CFR part 50, paragraph IV.F.2, proposed § 50.200(c)(1)(vi)(B) would require licensees with PDEPs to continue to describe provisions for the conduct of EP exercises that test the adequacy of timing and content of implementing procedures and methods, test emergency equipment and communications networks, and ensure emergency organization personnel are familiar



with their duties. Licensees with PDEPs would not be required to test the public alert and notification system during their exercises because the system would no longer be required, as discussed previously in this document.

Proposed § 50.200(c)(1)(vi)(B)(1) and (2) would require licensees with PDEPs to conduct an exercise within two years of the NRC's docketing of § 50.82(a)(1) or § 52.110(a) certifications and to continue to conduct subsequent biennial exercises of onsite emergency plans. Licensees with PDEPs would need to continue to conduct drills during the intervals between biennial exercises involving a combination of principal functional areas. The principal functional areas of emergency response for licensees with PDEPs would include all of the areas currently listed under appendix E to 10 CFR part 50, paragraph IV.F.2.b, with the exception of protective action development and protective action decision making (see discussion on protective action recommendations in the section "*PDEP Offsite Radiological Protective Action Recommendations*" in this document).

Similar to the requirements in appendix E to 10 CFR part 50, paragraph IV.F.2.f, proposed § 50.200(c)(1)(vi)(B)(4) would require licensees with PDEPs to conduct remedial exercises if the emergency plan is not satisfactorily tested during the biennial exercise. Like appendix E to 10 CFR part 50, paragraph IV.F.2.g, proposed § 50.200(c)(1)(vi)(B)(5) would require licensees with PDEPs to provide for formal critiques of exercises, drills, and training that provide performance opportunities to develop, maintain, or demonstrate key skills and to correct weaknesses or deficiencies identified in a critique.

Proposed § 50.200(c)(1)(vi)(B)(6) would require licensees with PDEPs to continue to use drills and exercise scenarios that provide reasonable assurance that anticipatory responses will not result from preconditioning of participants and that

emphasize coordination among onsite and offsite response organizations. Unlike the current requirements under appendix E to 10 CFR part 50, paragraphs IV.F.2.b, IV.F.2.i, and IV.F.2.j, licensees with PDEPs would not be required to submit exercise scenarios 60 days before use in an exercise, demonstrate that exercise scenarios include a wide spectrum of radiological releases and events, or vary exercise scenarios across an eight calendar year exercise cycle to allow for the demonstration of responses to specified scenario elements, respectively. These requirements would no longer apply due to the limited types of events that could occur. The previously routine progression to a General Emergency, or even a Site Area Emergency, in power reactor site scenarios is not applicable for licensees with PDEPs.

The NRC is issuing DG-1346 for public comment in conjunction with this proposed rule; DG-1346 provides one method acceptable to the NRC for licensees with PDEPs to comply with the proposed drill and exercise requirements.

### **PDEP Offsite Response Organization Participation in Drills and Exercises**

Appendix E to 10 CFR part 50, paragraph IV.F and § 50.47(b)(14) include requirements for periodic EP drills and exercises for licensees. Appendix E to 10 CFR part 50, paragraphs IV.F.2.c and IV.F.2.d requires offsite radiological emergency plans for each site to be exercised biennially with full participation by offsite authorities having a role under the radiological response plan. Appendix E to 10 CFR part 50, paragraphs IV.F.2.f and IV.F.2.h address State and local participation in remedial exercises and refusal of State and local governments to participate. Because no action is required from State and local government organizations in response to events other than firefighting, law enforcement, and ambulance/medical services, the requirements related to ORO participation in radiological drills and exercises would no

longer be applicable to licensees with PDEPs. Proposed amendments to appendix E to 10 CFR part 50, paragraph IV.F.2.k and § 50.200(c)(1)(vi)(B) would remove the requirement to exercise offsite plans after the NRC has docketed the licensee's certifications required under § 50.82(a)(1) or § 52.110(a) for each reactor at the site. For facilities that are located either on the same site or on adjacent contiguous sites, the offsite plans would continue to be exercised as required under appendix E to 10 CFR part 50, paragraph IV.2.f, as long as there is an operating reactor at the site. Similar to the requirements under appendix E to 10 CFR part 50, paragraph IV.2.f.e, under proposed § 50.200(c)(1)(vi)(B)(3), a licensee with a PDEP would be required to enable any State or local government to participate in the licensee's drills and exercises when requested.

#### 6. Independent Spent Fuel Storage Installation-Only Emergency Plans

In order to transition to an IOEP, the NRC is proposing under § 50.54(q)(7)(iii) that licensees must have all spent fuel in dry cask storage. Licensees with an IOEP must follow and maintain the effectiveness of an emergency plan that meets the requirements in § 72.32(a).

Licensees with 10 CFR part 72 specific licenses or 10 CFR part 72 general licenses may hold an IOEP. A licensee with all of its spent fuel in dry cask storage that terminates its 10 CFR part 50 or 10 CFR part 52 license must first obtain a 10 CFR part 72 specific license before transitioning to the EP requirements already provided in § 72.32(a). A licensee maintaining its 10 CFR part 50 or 10 CFR part 52 license, and thus its 10 CFR part 72 general license authorized under § 72.210, "General license issued," may opt to change its EP program to align it with the requirements of § 72.32 once all spent fuel is transferred to dry cask storage. In addition, licensees with

10 CFR part 72 general licenses would need to continue to comply with all applicable 10 CFR part 50 and 10 CFR part 52 requirements until the 10 CFR part 50 or 10 CFR part 52 license is terminated consistent with § 50.82 or § 52.110, respectively.

Under proposed § 50.54(q)(7)(iii), a licensee may choose not to comply with the EP requirements under § 72.32 and may instead maintain a PSEP or PDEP. Licensees with dry cask storage must ensure that the emergency plan includes an appropriate EAL scheme.

The NRC is issuing DG-1346 for public comment in conjunction with this proposed rule; DG-1346 provides guidance on transitioning to and maintaining an IOEP.

#### 7. All Spent Fuel Removed from Site

During the fourth level of decommissioning, the proposed rule would allow a licensee to terminate its EP program under proposed § 50.54(q)(7)(iv). Once all spent fuel has been permanently removed from the site, the site no longer poses any risk of a radiological release. The licensee must then continue to follow its PSDAR submitted under § 50.82 until decommissioning is completed.

#### 8. Changes to Emergency Plans

Existing § 50.54(q)(2) requires nuclear power reactor licensees to follow and maintain the effectiveness of an emergency plan that meets the planning standards in § 50.47(b) and the requirements in appendix E to 10 CFR part 50. In addition, § 50.54(q)(3) contains the conditions under which the licensee may make changes to its emergency plan without prior application to and approval by the NRC, provided that the changes do not reduce the effectiveness of the plan and that the plan, as changed, continues to meet the standards in § 50.47(b) and the requirements in appendix E to

10 CFR part 50. The NRC is proposing to add several new paragraphs that, similar to § 50.54(q)(2) and (3), would reference the requirements that emergency plans for decommissioning power reactors must meet and the process for making these plan changes. In particular, proposed § 50.54(q)(7) would reference the applicable emergency plan requirements after the NRC docket a licensee's certifications under § 50.82(a)(1) or § 52.110(a), and proposed § 50.54(q)(8) would stipulate the conditions under which decommissioning power reactor licensees may make changes to their emergency plans without prior approval by the NRC. The NRC also would revise § 50.54(q)(1) to clarify that the definitions in paragraph (q) apply to only paragraph (q).

The existing change process under § 50.54(q) does not establish whether a proposed change would impact reasonable assurance determinations; the change process establishes only whether the licensee has the authority to implement the proposed change without prior NRC approval. The change process uses the characteristic "reduction in effectiveness" to exclude from the requirement to seek prior NRC approval those changes that would likely not reduce the effectiveness of the licensee's emergency plan. Because these changes would not reduce the effectiveness of the plan, the NRC expects that the changes should not have an impact on the agency's reasonable assurance determination. A licensee's determination that a proposed change would reduce the effectiveness of the emergency plan does not mean that the licensee could not or would not implement appropriate protective measures to protect public health and safety during an accident, but only that prior NRC review is required to evaluate the impact of the change on the reasonable assurance determination. As part of routine oversight, the NRC screens emergency plan changes, including EAL changes, and reviews a sample of changes submitted under § 50.54(q)(5) that could potentially reduce effectiveness. These reviews do not constitute the NRC's

approval of the plan changes, and all such changes remain subject to future inspection and enforcement actions. The NRC documents its approval of plan changes under § 50.54(q)(4) in its decisions to grant license amendment requests.

The licensee cannot properly evaluate a proposed change to the emergency plan if it has not considered the basis for the NRC's approval of the original plan or the basis for any subsequent changes to the plan—whether those changes were approved by the NRC or implemented by the licensee without prior NRC approval under § 50.54(q). Regulatory Guide (RG) 1.219, Revision 1, “Guidance on Making Changes to Emergency Plans for Nuclear Power Reactors” (ADAMS Accession No. ML16061A104), describes a method that the NRC considers acceptable to implement the requirements in § 50.54(q) as they relate to EP and specifically to making changes to emergency response plans. As provided in RG 1.219, the licensee should consider its licensing basis to inform a § 50.54(q) evaluation, and, principally, applicable regulatory requirements, which are binding on the licensee unless the NRC explicitly exempts the licensee from them. The NRC is issuing DG-1346 for public comment in conjunction with this proposed rule to provide guidance for decommissioning power reactors in evaluating changes to emergency plans under proposed § 50.54(q).

The change process is meant to ensure that plans are maintained up to date and that the level of planning does not fall below the standards to which the licensee has committed. The regulations in § 50.54(q) define “reduction in effectiveness” as a change in an emergency plan that results in reducing the licensee's capability to perform an emergency planning function in the event of a radiological emergency. “Emergency planning function” is currently defined as a capability or resource necessary to prepare for, and respond to, a radiological emergency, as established in the planning standards of § 50.47(b) and the elements of appendix E to 10 CFR part 50, section IV. The NRC is

proposing to remove the references to the planning standards of § 50.47(b) and appendix E to 10 CFR part 50 from this definition because this proposed rule would establish alternative emergency planning standards under proposed § 50.200, and the NRC does not consider the references essential to the definition.

When the NRC considers exemptions from EP requirements for a decommissioning power reactor licensee, the NRC determines, among other things, that the exemptions can be implemented without reducing reasonable assurance that adequate protective measures can and will be implemented. Once the NRC grants the licensee exemptions from EP requirements, the licensee does not need to submit a separate license amendment request for NRC approval of the emergency plan changes unless the plan changes go beyond those resulting from the exemptions granted. The NRC intends that this proposed rule would establish clear regulatory requirements for EP, reducing the need to request certain exemptions. As such, the NRC is proposing to add § 50.54(q)(8) to establish the process for: (1) transitions from one decommissioning level's EP planning standards and requirements to the next level's EP planning standards and requirements, and (2) changes to emergency plans within a decommissioning level.

In considering a graded approach to EP, the NRC recognizes that a transition between the EP planning standards and requirements of each decommissioning level is not equivalent to making changes to the emergency plan within a level. The transition between the EP planning standards and requirements of each decommissioning level is fundamentally a licensee's commitment to a different set of EP standards and associated emergency planning functions, and the change process should facilitate this transition.

For transitions from one decommissioning level to the next, the NRC would require licensees to establish emergency plans that meet the EP planning standards and requirements of the next level. The transition is optional, and a licensee that maintains its current level of emergency planning would satisfy the requirements of the next level; however, doing so would mean maintaining emergency planning functions above the commensurate level of planning for the risk involved. Under the proposed § 50.54(q)(8), a licensee would be able to make changes to the emergency plan to commit to the EP planning standards and requirements of the next decommissioning level (i.e., PSEP, PDEP, or IOEP) using the § 50.54(q)(3) change process, but would only need to consider whether the changes meet the next level's planning standards and requirements. Licensees making changes to their emergency plans to commit to the EP planning standards and requirements of a decommissioning level would not be required to determine if the changes are reductions in effectiveness. Instead, the NRC would have already made this determination through its issuance of the regulations promulgating the EP planning standards and requirements of the decommissioning levels. The NRC's proposed regulatory approach to transitions between EP decommissioning levels does not go beyond the authority currently granted to licensees to make changes to their emergency plan under § 50.54(q)(3). Additionally, any change to the emergency plan that is not made to comply with the EP planning standards and requirements of the next decommissioning level would require a licensee to make a determination as to whether the change would be a reduction in effectiveness.

After the Three Mile Island accident in 1979, the NRC issued a final rule (45 FR 55402; August 19, 1980) (1980 EP Final Rule) that included § 50.54(u), which required licensees to upgrade their emergency plans to meet the then-new planning standards of § 50.47(b) and requirements in appendix E to 10 CFR part 50 and to submit those plans



to the NRC. In the 2011 EP Final Rule, the NRC removed and reserved § 50.54(u). The NRC's proposed approach to transitions between EP planning standards and requirements of decommissioning levels is analogous to the approach taken by the NRC when the 16 EP planning standards went into effect in 1980 (see "*Reasonable Assurance and Offsite Radiological Emergency Preparedness*" section in this document). Under this approach, the NRC would not be relinquishing its oversight authority, as some commenters on the ANPR and draft regulatory basis supposed. As proposed, § 50.54(q)(8)(i) would require initial emergency plan changes made to transition between EP decommissioning levels to be submitted to the NRC at least 60 days prior to implementation, and emergency plans would remain subject to future inspection and enforcement. The proposed submittal is not intended to be a licensing action. It would provide a current copy of the emergency plan to the NRC prior to implementation in support of future inspection activities. This submittal would provide an opportunity for the NRC to assure that the licensee maintains the effectiveness of its emergency plan. Subsequent emergency plan changes would need to follow the existing change control process under § 50.54(q)(3) and (4). Hearing rights would not attach to transitions between EP decommissioning levels; however, the public has the opportunity to comment on the graded EP planning standards and requirements themselves in response to this proposed rule and the drafts of the supporting guidance documents. In addition, all emergency plan changes submitted under § 50.54(q)(5) and proposed § 50.54(q)(8) would be publicly available.

In addition to the general requirements in proposed § 50.54(q)(8)(i) governing transitions between EP decommissioning levels, proposed § 50.54(q)(8) would address changes specific to SSCs and EALs. Proposed § 50.54(q)(8)(ii) would specify that, for SSCs that are no longer needed to provide support for an emergency planning function

(as defined under proposed § 50.54(q)(1)(iii)), a licensee may make a determination under § 50.54(q)(3) that emergency plan changes are not a reduction in effectiveness if the FSAR demonstrates that these SSCs are no longer required to be in service due to the decommissioning status of the facility. Proposed § 50.54(q)(8)(iii) would state that changes to EALs based on plant conditions that are not physically achievable or instrumentation that is no longer in service due to the transition to decommissioning are not reductions in effectiveness provided that a § 50.54(q)(3) evaluation demonstrates that the change does not reduce the capability of taking timely and appropriate protective actions. The NRC is proposing these requirements to provide clarity on § 50.54(q)(3) evaluations and alleviate the burden on licensees from submitting emergency plan changes that result from SSCs and instrumentation that are no longer required to be in service due to decommissioning.

After the implementation of a PSEP, PDEP, or IOEP, licensees would be required by proposed § 50.54(q)(7)(i) to continue to follow and maintain the effectiveness of the plan and by proposed § 50.54(q)(8)(i) to comply with the change process described under existing § 50.54(q)(3) and (q)(4). Therefore, licensees would be allowed to make changes to these emergency plans without prior application to and approval by the NRC, provided that the changes would not reduce the effectiveness of the plan and that the plan, as changed, would continue to meet the EP planning standards and requirements for the applicable decommissioning level. Current § 50.54(q)(5) would require decommissioning licensees to submit to the NRC a report of each such change within 30 days after the change is put into effect. And, consistent with current requirements, decommissioning licensees would have to submit changes that would reduce the effectiveness of the plan for prior NRC review and approval in accordance with § 50.54(q)(4) so that the NRC could make the requisite reasonable

assurance determination. For subsequent emergency plan changes once all fuel is in dry cask storage (i.e., for changes to an IOEP), proposed § 50.54(q)(8)(i) would allow licensees to follow the change process under § 72.44(f).

The proposed amendments to the regulatory change process are necessary because:

- The regulation in existing § 50.54(q)(2), which provides that a licensee must follow and maintain the effectiveness of the emergency plan, should continue to apply in order to ensure that emergency plans are followed and kept up to date.
- The existing § 50.54(q) change process and the associated regulatory guidance currently do not address how a licensee could change its emergency plans to comply with the emergency plan standards as the licensee transitions to each level of decommissioning.
- This proposed rule would allow the NRC to maintain, through a regulatory change process, reasonable assurance that a licensee can and will take adequate protective measures in the event of a radiological emergency.

The proposed amendments to § 50.54(q), and related regulatory guidance, would ensure that licensees would maintain the effectiveness of the emergency plans.

Emergency plans that comply with the proposed graded EP planning standards and requirements would continue to provide reasonable assurance that adequate protective measures can and will be taken. Any plan that did not meet these standards and requirements and, if applicable, the reduction in effectiveness criterion, would be subject to future inspection and enforcement actions. The proposed approaches to transitioning between EP decommissioning levels and to making emergency plan changes within decommissioning levels would provide an efficient and effective regulatory change

process and would promote consistent and predictable implementation and enforcement.

9. Program Element Review under § 50.54(t)

Under current § 50.54(t), licensees must conduct reviews of EP program elements either: (1) at intervals not to exceed 12 months, or (2) as necessary, based on an assessment by the licensee against performance indicators and as soon as reasonably practicable after a change occurs in personnel, procedures, equipment, or facilities that potentially could adversely affect EP. If a licensee chooses the second option, it must still review all program elements at least once every 24 months. For several reasons, the proposed rule would provide decommissioning licensees with an alternative approach to reviewing EP program elements.

First, the NRC expects licensees to remain in the first level of decommissioning (i.e., with a PSEP) for less than 24 months, and the scope of a PSEP is largely unchanged from the scope of an operating reactor's emergency plan. Conversely, the second level of decommissioning (i.e., licensees with a PDEP) will involve more significant changes, and the NRC anticipates that licensees would remain in the second level of decommissioning for a longer period of time. Therefore, in order to support the transition to a PDEP and to ensure a practicable timeframe for review, the NRC is proposing to amend § 50.54(t) such that, starting after the NRC's docketing of certifications under § 50.82(a)(1) or § 52.110(a), licensees would be able to conduct program element reviews under § 50.54(t) at intervals not to exceed 24 months (rather than 12 months) without conducting an assessment against performance indicators. As a result, it is expected that licensees would conduct a program element review shortly after implementing a PDEP. With this proposed change, the NRC seeks to ensure that a

licensee evaluates its EP program soon after it transitions to a PDEP. This proposed change would focus licensee resources on conducting program element reviews during the second/PDEP level of decommissioning. The NRC is proposing to add new § 50.54(t)(3) to remove the requirement to conduct periodic EP program element reviews once all fuel is in dry cask storage (i.e., the third/IOEP level of decommissioning), consistent with the EP requirements for ISFSIs under 10 CFR part 72.

#### 10. Reasonable Assurance and Offsite Radiological Emergency Preparedness

The regulations in §§ 50.47 and 50.54, “Conditions of licenses,” prescribe how the NRC will make licensing decisions or take appropriate enforcement actions by using findings of reasonable assurance that adequate protective measures can and will be taken to protect public health and safety in the event of a radiological emergency. Every 10 CFR part 50 or 10 CFR part 52 license includes as a condition of the license the requirements of § 50.54(s)(2)(ii) and (s)(3) regarding findings and determinations of reasonable assurance. The NRC has the authority and responsibility to make licensing findings on the overall adequacy of onsite and offsite emergency planning and preparedness. Commensurate with the NRC’s responsibility to make such findings, the NRC has the authority to collect, review, and evaluate any information it needs to support its findings on EP. If available, the NRC must consider FEMA findings and determinations regarding the status of offsite EP. The relationship between the NRC and FEMA concerning findings of reasonable assurance of offsite EP is based on the Atomic Energy Act of 1954, as amended (AEA); the Energy Reorganization Act of 1974, as amended; the NRC Authorization Act for Fiscal Year 1980, the NRC’s regulations; a memorandum of understanding between the two agencies (“Memorandum of

Understanding Between the Department of Homeland Security/Federal Emergency Management Agency and Nuclear Regulatory Commission Regarding Radiological Emergency Response, Planning, and Preparedness”) first established in 1980 and last updated in 2015 (ADAMS Accession No. ML15344A371); and case law (e.g., *Massachusetts v. United States*, 856 F.2d 378, 382 (1st Cir. 1988); *State of Ohio ex rel. Celebrezze v. NRC*, 868 F.2d 810, 815-16 (6th Cir. 1989)).

Not all licensing decisions involving EP require findings and determinations on the adequacy of offsite plans. In the EP regulations for research and test reactors, fuel cycle facilities, and ISFSIs, there are no regulatory standards or requirements for offsite radiological emergency plans. As such, FEMA findings and determinations are not needed to support NRC licensing decisions for such facilities. The absence of NRC regulatory standards for offsite radiological EP at those facilities does not imply that offsite emergency planning, in general, is not adequate to protect the public health and safety. In addition, the support provided by offsite organizations does not automatically necessitate the need for findings and determinations. In the Low Power Rule (47 FR 30232; July 13, 1982), findings and determinations on the state of offsite EP were not needed to support issuance of a license for fuel loading and low-power testing because there was sufficient time (at least 10 hours) in which to take action to protect the public in even the worst case accident. Additionally, the NRC has concluded in its review of several EP exemption requests for permanently shutdown and defueled nuclear power reactor licensees that formal offsite radiological emergency plans are not necessary after the spent fuel in the SFP has sufficiently decayed such that it would not reach ignition temperature within 10 hours under adiabatic heatup conditions. As a result, continued consultation with FEMA regarding the adequacy of the offsite plans was also no longer necessary.

For decommissioning power reactors, the NRC is proposing that if regulatory standards for offsite radiological EP are not required, then findings and determinations on the adequacy of offsite plans would not be needed in order for the NRC to make determinations regarding reasonable assurance under § 50.54(s)(2)(ii). Therefore, the NRC is proposing changes to § 50.54(s)(3) to clarify that FEMA findings and determinations are only necessary when the NRC's planning standards apply to offsite radiological emergency response plans. Additionally, the NRC staff is proposing to add a new § 50.47(f) to clarify when the 16 planning standards apply to offsite radiological emergency plans. A licensee must follow and maintain the effectiveness of its emergency plan if the NRC is to continue to find, under § 50.54(s)(2)(ii), that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency, and § 50.54(s)(2)(ii) would continue to apply to licensees as a condition of the license during decommissioning.

In 1979, the NRC predicated the rationale for the EP proposed rule (44 FR 75167; December 19, 1979) on the Commission's considered judgment in the aftermath of the accident at Three Mile Island. At the time, the Commission concluded that it must be in a position to know that offsite governmental plans had been reviewed and found adequate. However, the Commission also noted that the proposed rule was considered an interim upgrade of NRC emergency planning regulations based on past experience, and that further changes to emergency planning regulations may be proposed as more experience is gained. The NRC viewed the 1979 proposed rule as a first step in improving emergency planning.

The NRC recognizes the experience gained from implementing its regulations and also that significant advances in emergency planning have occurred over the decades following the accident at Three Mile Island. In particular, the terrorist attacks on

September 11, 2001, led to the establishment of the U.S. Department of Homeland Security, and lessons learned from disasters such as Hurricane Katrina have resulted in a national effort to prepare for and respond to all hazards and disasters. Homeland Security Presidential Directive 5, "Management of Domestic Incidents" (February 28, 2003), and Presidential Policy Directive (PPD)-8, "National Preparedness" (issued March 30, 2011), established national initiatives for a common approach to preparedness and response. These initiatives include the National Incident Management System, National Preparedness Goal, Core Capabilities, National Preparedness System, National Planning Frameworks, and the development of comprehensive preparedness guides and exercise methodologies.

The PPD-8 directed the development of a national preparedness goal that identifies the core capabilities necessary for preparedness and a national preparedness system to guide activities that will enable the nation to achieve the goal. Core capabilities are intended to help coordinate and unify efforts, improve training and exercise programs, promote innovation, and ensure that the administrative, finance, and logistics systems are in place to support these capabilities. The PPD-8 is aimed at facilitating an integrated, all-of-nation, capabilities-based approach to preparedness, under the assumption that national preparedness is the shared responsibility of the "whole community," which includes all levels of government, the private and nonprofit sectors, and individual citizens. Acknowledging the national preparedness goal, the NRC maintains the sole legal authority to establish any regulations it deems necessary to ensure the adequate protection of public health and safety from radiological events.

For a decommissioning site, the licensee, as part of the whole community, will maintain radiological EP capabilities. Only in the highly unlikely event of a zirconium fire—in which mitigation actions were not successful—would there be a potential need to



initiate response actions off site. But unlike the EP planning basis for an operating reactor, within a few months of cessation of operations, there is no longer a potential need to provide for prompt protective actions in the event of an accident. Additionally, protective actions such as evacuation are not unique to radiological events and occur in response to other unique hazards such as chemical spills, fires, and natural disasters, and are often initiated without any pre-planning. In NUREG-0396, the NRC states that “It has been, and continues to be the Federal position that it is possible (but exceedingly improbable) that accidents could occur calling for additional resources beyond those that are identified in specific emergency plans developed to support specific individual nuclear facilities. Further, the NRC and Federal position has been and continues to be, that as in other disaster situations, additional resources would be mobilized by State and Federal agencies.”

State and local governments are responsible for the protection of public health and safety (including at industrial sites like decommissioning reactors), and the NRC has high confidence in the ability of OROs to implement appropriate response actions when necessary. This confidence is further strengthened by the NRC’s recognition of national-level efforts, in which the NRC participates, to improve the state of emergency planning at all levels of government and within the whole community. Consequently, for facilities licensed by the NRC where radiological hazards are unlikely to have an offsite impact, the risk posed by the remaining low-level hazard is somewhat analogous to that posed by non-nuclear hazards (e.g., train derailments or oil spills) that are addressed by all-hazards planning and not by a separate radiological emergency plan. In such conditions, there is reasonable assurance that appropriate response actions can and will be taken in the event of a radiological emergency, without the need for regulatory

standards for offsite radiological emergency response plans and the associated FEMA findings and determinations that offsite plans are adequate and can be implemented.

#### 11. Clean-up of Regulations

The NRC is proposing to remove obsolete dates for certain one-time actions that were required as part of the 2011 EP Final Rule and other obsolete dates. These actions are complete, and the requirements are no longer binding on any current licensee. The dates of requirements proposed to be removed are:

(1) Section 50.54(s)(2)(ii), which allows the NRC to shut down power reactors that did not provide reasonable assurance that adequate protective measures would be taken in the event of a radiological emergency after April 1, 1981. There is no longer a need for the date requirement of this provision because any future determinations made under § 50.54(s) will be after April 1, 1981. The NRC is proposing to delete “after April 1, 1981” and retain the remainder of the provision.

(2) Paragraph 6 of appendix E to 10 CFR part 50, section I, which was used to promulgate specific compliance dates for the Tennessee Valley Authority Watts Bar Nuclear Plant that was under construction at the time of the 2011 EP Final Rule. Because the Watts Bar Nuclear Plant is now operational and subject to all current requirements for operating reactors, the NRC is proposing to delete this provision.

(3) Appendix E to 10 CFR part 50, paragraph IV.4, which required nuclear power licensees to develop an ETE analysis using decennial data published within 365 days of the later date of the most recent decennial data or December 23, 2011. There is no longer a need for the date requirement of this provision because the date has expired. The NRC is proposing to delete “of the later of the date of” and “or December 23, 2011” from this provision.

(4) Appendix E to 10 CFR part 50, paragraph IV.A.7, which required licensees to identify and describe the expected assistance from appropriate local, State, and Federal agencies during an emergency, including a hostile act, by June 23, 2014. The NRC is proposing to delete “by June 23, 2014” from this provision because the date has expired.

(5) Appendix E to 10 CFR part 50, paragraph IV.A.9, which required licensees to conduct a detailed analysis by December 24, 2012, demonstrating that on-shift personnel are not assigned responsibilities that would prevent the timely performance of assigned functions in the emergency plan. The NRC is proposing to delete “By December 24, 2012” from this provision because the date has expired.

(6) Appendix E to 10 CFR part 50, paragraph IV.B.1, which required licensees, by June 20, 2012, to establish EALs that include hostile action that may adversely affect the nuclear power plant. There is no longer a need for the date requirement of this provision because the date has expired. The NRC is proposing to remove “By June 20, 2012” and retain the remainder of the provision.

(7) Appendix E to 10 CFR part 50, paragraph IV.C.2, which required licensees, by June 20, 2012, to establish and maintain capability to assess, classify, and declare an emergency condition within 15 minutes after indications that an EAL had been exceeded. There is no longer a need for the date requirement of this provision as the date has expired. The NRC is proposing to delete “By June 20, 2012” and retain the remainder of the provision.

(8) Appendix E to 10 CFR part 50, paragraph D.4, which included compliance periods for the backup alert and notification capability requirements under appendix E to 10 CFR part 50, paragraph D.3, including a final deadline of June 22, 2015. The NRC is proposing to remove this paragraph because the dates in the paragraph have expired, and any future applicants required to comply with appendix E to 10 CFR part 50 would

be required to comply with the requirements of appendix E to 10 CFR part 50, paragraph D.3.

(9) Appendix E to 10 CFR part 50, paragraph IV.E.8.c, which required licensees' EOFs to have the capabilities required under the section by June 20, 2012. Because the date requirement of this provision has expired, the NRC is proposing to delete "By June 20, 2012" from this provision.

(10) Appendix E to 10 CFR part 50, paragraph IV.E.8.d, which required licensees to identify an alternative facility that would be accessible in the event of hostile action by December 23, 2014, with the exception of the capability for staging ERO personnel at the alternative facility and communications capabilities with emergency responses facilities, which had to be implemented by June 20, 2012. There is no longer a need for the date requirements of this provision as the dates have expired. The NRC is proposing to delete the deadlines for the implementation of this provision.

(11) Appendix E to 10 CFR part 50, paragraph IV.F.2.d, which required licensees to fully participate in one hostile action by December 31, 2015. Because the date requirement of this provision has expired, the NRC is proposing to delete "and should fully participate in one hostile action exercise by December 31, 2015" from this provision.

(12) Appendix E to 10 CFR part 50, paragraph IV.F.2.j, which required licensees to conduct a hostile action exercise for each of their sites no later than December 31, 2015. Because the date requirement of this provision has expired, the NRC is proposing to delete the requirement from this provision.

(13) Appendix E to 10 CFR part 50, paragraph VI.I, which required licensees, by June 20, 2012, to provide a range of protective actions to protect onsite personnel during hostile action. Because the date requirement of this provision has expired, the NRC is proposing to delete "By June 20, 2012" from this provision.

(14) Appendix E to 10 CFR part 50, paragraph VI.4.a, which required licensees to develop and submit an ERDS implementation plan to the NRC by October 28, 1991. There is no longer a need for the date requirement of this provision because the date has expired. The NRC is proposing to delete “by October 28, 1991” from this provision.

(15) Appendix E to 10 CFR part 50, paragraph VI.4.d, which required licensees to complete the implementation of the ERDS by February 13, 1993, or before escalation to full power, whichever comes later. There is no longer a need for the date requirement of this provision because the date has expired. The NRC is proposing to delete “by February 13, 1993, or” and “whichever comes later” from this provision and to continue to require licensees to submit an ERDS implementation plan to NRC before escalation to full power.

The NRC is proposing to eliminate these completed one-time requirements in the interest of regulatory clarity. Eliminating these requirements would not relax any currently effective regulatory requirement or cause any regulatory burden for current or future licensees or applicants.

## 12. Revisions to § 72.32

The NRC proposes to amend § 72.32(a) to address the applicability of that provision’s requirement that an application for a specific license ISFSI must include an emergency plan that includes the information in § 72.32(a)(1) through (16). The proposed amendment would clarify that the requirement applies when the proposed ISFSI would not be located on the site or within the exclusion area of a nuclear power reactor licensed under 10 CFR parts 50 or 52. A power reactor licensed under 10 CFR parts 50 or 52 could be under construction, operating, or in decommissioning. The

proposed revisions would consolidate the current language and remove redundancies by using standardized language consistent with other amendments in this proposed rule.

The NRC proposes to amend § 72.32(c) to clarify that the nuclear power reactor referenced in that provision need not be authorized to operate for the ISFSI licensee to use the emergency plan requirements in § 50.47 to meet the requirements of § 72.32. Currently, § 72.32(c) applies to ISFSI licensees located on the site or within the exclusion area of a nuclear power reactor that is licensed to operate. Because a nuclear power reactor licensee is not authorized to operate once the NRC docket the certifications required under § 50.82(a)(1) or § 52.110(a), § 72.32(c) could be read not to apply to an ISFSI licensee at a decommissioning reactor site. However, the current language of § 72.32 allows an ISFSI licensee with a reactor emergency plan to use that emergency plan to meet the applicable requirements for an ISFSI emergency plan. Therefore, the proposed rule would clarify that, when the nuclear power reactor is under construction, operating, or in decommissioning, the ISFSI licensee could rely on the emergency plan requirements in § 50.47 to meet the requirements of § 72.32.

## **B. Physical Security**

The NRC's regulations governing physical security at a nuclear power reactor typically do not distinguish between an operating nuclear power reactor and a power reactor that is in a decommissioning status. However, the security risk profile presented by a decommissioning reactor decreases significantly from that of an operating power reactor due to the reduction in the number of target sets<sup>5</sup> and the reduced

---

<sup>5</sup> A target set is the minimum combination of equipment or operator actions which, if all are prevented from performing their intended safety function or prevented from being accomplished, would likely result in radiological sabotage.

consequences of radiological sabotage. The radiological consequences of a security event decrease as reactors transition through each of the following four levels of decommissioning: (1) permanent cessation of operations and permanent removal of all fuel from the reactor vessel, (2) sufficient decay of fuel in the SFP such that it would not reach ignition temperature within 10 hours under adiabatic heatup conditions, (3) transfer of all fuel to dry storage, and (4) removal of all fuel from the site.

Decommissioning nuclear power reactor licensees have sought NRC approval of exemptions from, license amendments for, and alternative measures to, certain physical security regulatory requirements because of the reduction in the number of target sets and the reduced consequences of radiological sabotage as the power reactor site transitions through these levels. The NRC is proposing options to allow nuclear power reactor licensees to make certain commonly-requested changes to their physical security plans based on these decommissioning levels without requesting exemptions, alternative measures, or license amendments.

### **Security Plans**

Upon the cessation of operations and removal of all fuel from the reactor vessel, licensees typically seek to modify their security plans to reflect changes in site conditions. The NRC's regulations in § 50.54(p) establish processes that allow licensees to make changes to their security plans. Section 50.54(p)(1) requires licensees to seek NRC review and approval of any changes that result in a decrease in safeguards effectiveness of their security plans. Section 50.54(p)(2) allows licensees to make changes to their security plans without prior NRC approval provided that the changes do not decrease the safeguards effectiveness of the plan.

The current regulations do not define the term “decrease in safeguards effectiveness” nor do they include examples of the types of changes that would constitute a decrease in safeguards effectiveness. Additionally, there is no definition of the term “change.” This lack of clear definitions has resulted in difficulties for licensees implementing security plan changes. For example, some licensees have implemented changes under § 50.54(p)(2) that the NRC later determined decreased the safeguards effectiveness of their security plan. Similarly, some licensees have unnecessarily requested NRC review and approval of changes that did not decrease the safeguards effectiveness of their security plan.

The NRC is proposing to revise § 50.54(p) to include definitions of the terms “change” and “decrease in safeguards effectiveness.” The application of these definitions would be limited to the revised § 50.54(p) and would apply to all 10 CFR part 50 and 10 CFR part 52 licensees with operating, decommissioning, and/or decommissioned reactor units. The term “change” would be defined in a new § 50.54(p)(1)(i) to mean an action that results in a modification of, addition to, or removal from, the licensee’s security plans. The term “decrease in safeguards effectiveness” would be defined in a new § 50.54(p)(1)(ii) to mean a change or series of changes to an element or component of the security plans referenced in § 50.54(p)(2) that reduces or eliminates the licensee’s ability to perform or maintain the capabilities established in § 73.55(b)(3)(i) without compensating changes to other security plan elements or components.

Currently, decommissioning (and operating) reactor licensees use the § 50.54(p)(2) process to implement changes that they have determined do not decrease the safeguards effectiveness of their security plans. The § 50.54(p)(2) process requires that licensees submit a report of these changes to the NRC. In addition to a description



of these changes, reactor licensees have typically included in their report supplemental information demonstrating that such changes do not constitute a decrease in safeguards effectiveness. The submittal of this supplemental information in the reports has been voluntary. The NRC's practice is to review these reports to confirm that the licensee properly concluded that the changes would not decrease the safeguards effectiveness of their Commission-approved security plan. The submittal of supplemental information in the reports allows the NRC to verify in a timely manner that the change does not result in a decrease in the safeguards effectiveness of the plan. Without this supplemental information, the NRC could only make this determination through the inspection process. The NRC is proposing to require that reactor licensees include with the required § 50.54(p)(2) report a summary of the analysis performed to determine that the change does not decrease safeguards effectiveness of the security plan. The summary must be sufficient to demonstrate that the change does not decrease the safeguards effectiveness of the plan.

A licensee considering a security plan change under § 50.54(p)(2) must ensure that the plan as changed continues to meet the requirements in § 73.55(c). In the supplemental information that the NRC currently receives with the licensee's report, the licensee generally performs an analysis of the change to a level of rigor and thoroughness commensurate with the scope of the proposed change. A licensee's analysis of the impact of a change on the safeguards effectiveness of the plan generally considers the security scenarios included in its physical security plan, the licensing basis of the particular physical security plan, and any physical security plan elements implemented to address site-specific conditions (e.g., delay in staff response times, communications with State or local governments, mitigation of significant insider threats, etc.).

## **Dry Cask Storage**

An ISFSI located at a nuclear power reactor site is typically licensed under a general license issued pursuant to subpart K of 10 CFR part 72. Under a general license, licensees are required to protect the SNF in the ISFSI in accordance with the physical security requirements in § 73.55, “Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage,” with the additional conditions and exceptions noted in § 72.212, “Conditions of general license issued under § 72.210.” The NRC also licenses certain ISFSIs under a 10 CFR part 72 specific license. Consistent with § 72.180, “Physical protection plan,” licensees holding a specific license are required to protect the SNF in the ISFSI in accordance with the physical security requirements in § 73.51, “Requirements for the physical protection of stored spent nuclear fuel and high-level radioactive waste.” Although the physical security requirements that apply to general license ISFSIs and specific license ISFSIs provide equivalent levels of protection, there are differences. For instance, § 73.55 requires licensees to ensure they maintain the capability to detect, assess, interdict, and neutralize threats. Section 73.51 requires licensees to detect and assess threats and communicate with an appropriate response organization. The additional requirements in § 73.55 that support interdiction and neutralization of threats is only one example of differences that lead to licensee requests for exemptions once all fuel has been placed in dry cask storage.

As stated at the beginning of this section, decommissioning reactors typically transition through four distinct levels during decommissioning. Many decommissioning licensees have submitted license amendment requests, requests for exemptions, and requests for approval of alternative measures to remove § 73.55 physical security

requirements that are no longer applicable once the licensee enters the third decommissioning level when all SNF has been moved to a dry cask storage system.

The need for license amendments, exemptions and approvals of alternative measures imposes a regulatory burden upon both licensees and the NRC. Accordingly, the NRC is proposing that once all SNF has been placed in dry cask storage, licensees may elect to follow the proposed § 72.212(b)(9)(vii) and protect a general license ISFSI in accordance with the physical security requirements in § 73.51. The applicability section of § 73.51 would also be amended to reflect this change. A licensee would be able to use the process established in the revised and renumbered § 50.54(p)(3) to make this change and submit its revised physical security plan to the NRC. These security plans would have to continue to address the applicable security-related orders associated with an ISFSI that are conditions of the license. The NRC is also proposing conforming changes to § 72.13, "Applicability," to reflect the requirements that would apply to a licensee that elects to follow the proposed § 72.212(b)(9)(vii).

### **Significant Core Damage**

The prevention of significant core damage and spent fuel sabotage is a general performance objective of the reactor licensee physical protection program required by § 73.55. During the first level of decommissioning, when the NRC has docketed a licensee's certifications that the reactor has permanently ceased operating and all fuel has been removed from the reactor vessel and placed in the SFP, there is no longer fuel in the core and therefore the risk to public health and safety from significant core damage has been removed. This reduced risk allows licensees to eliminate requirements to protect against significant core damage or train security and operational personnel to protect and respond to core damage events.

The NRC is proposing that a licensee of a decommissioning nuclear power reactor no longer be required to meet the requirement in § 73.55(b)(3) to protect against significant core damage once the NRC has docketed a licensee's certifications that the reactor has permanently ceased operating and all fuel has been removed from the reactor vessel. The requirement to protect against spent fuel sabotage would remain in place as long as spent fuel remains on the site.

### **Vital Areas**

A vital area (VA) is defined in § 73.2, "Definitions," as any area that contains vital equipment. Under § 73.2, vital equipment means any equipment, system, device, or material, the failure, destruction, or release of which could directly or indirectly endanger public health and safety by exposure to radiation. The NRC also considers the equipment or systems that would be required to function to protect public health and safety following such a failure, destruction, or release to be vital. There are specific physical security requirements for the protection of VAs and vital equipment. The current regulation in § 73.55(e)(9)(v) specifies that the reactor control room shall be considered a VA.

The role of the reactor control room at an operating plant, as described in General Design Criterion 19, "Control Room," of appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR part 50, is to provide a protected space from which actions can be taken to operate the nuclear power plant safely without interruption under normal or accident conditions. For a permanently shutdown and defueled nuclear power reactor, the vital equipment associated with operating the reactor vessel is no longer needed. The remaining vital equipment (e.g., associated with SFP cooling) ~~may no longer be needed or~~ may be relocated to a VA separate from the reactor control room or,

at a certain point, may no longer be needed. Once a reactor has permanently ceased operations, the need for a reactor control room is eliminated if all of the vital equipment is removed and if the area does not serve as the VA boundary for other VAs. The proposed rule would revise § 73.55(e)(9)(v) to provide that a licensee of a decommissioning nuclear power reactor would no longer need to designate the reactor control room as a VA if it does not otherwise meet the definition of a VA in § 73.2.

### **Communications**

Currently § 73.55(j)(4)(ii) requires continuous and redundant communications between the reactor control room and the central alarm station (CAS). Once a nuclear power reactor has permanently ceased operations, a licensee may no longer have a reactor control room or a licensed senior operator present in a reactor control room. Therefore, it would not be feasible for a licensee of a decommissioning nuclear power reactor to comply with the current regulatory requirement. Licensees typically request an exemption from this requirement and request that the CAS be allowed to establish continuous and redundant communications with the senior on-site licensee representative.

The NRC is proposing to amend § 73.55(j) to require continuous and redundant communications be maintained between the CAS and the CFH or senior on-shift licensee representative once the reactor has ceased operations and the licensee no longer has licensed senior operators in the control room. The intention of this change is to allow licensees flexibility in maintaining communications with one or both of these individuals.

Communication requirements will continue to include all the conditions currently required: continuous communication capability with onsite and offsite resources; radio

or microwave transmitted two-way voice communication, in addition to conventional telephone service, between the alarm stations and local law enforcement authorities; and alternative communication measures in place in areas where communication could be interrupted or cannot be maintained.

### **Suspension of Security Measures**

Current regulations in § 73.55(p) allow for the suspension of security measures in an emergency or during severe weather. A senior licensed operator must approve the suspension of security measures. Once a power reactor has entered decommissioning status and all fuel has been removed from the reactor, there may no longer be a licensed senior operator on site. Therefore, it may not be feasible for a licensee of a decommissioning nuclear power reactor to implement this requirement in the event of an emergency or severe weather.

The NRC is proposing to amend the requirements in § 73.55(p) to allow a certified fuel handler to suspend security measures in the event of an emergency or severe weather once the reactor has shutdown and all fuel has been removed from the reactor core.

These proposed changes to § 73.55(p) would be consistent with the existing regulations in § 50.54(x) and (y) that govern approvals for reasonable actions that a licensee may take to depart from a license condition or a technical specification in an emergency. In accordance with the provisions of § 50.54(y), licensee actions permitted by § 50.54(x) must be approved (at a minimum) by a licensed senior operator or, at a decommissioning nuclear power reactor after submittal of the certifications required under § 50.82(a)(1) or § 52.110(a), by either a licensed senior operator or a certified fuel handler, before taking the action.

### **C. Cyber Security**

The NRC is proposing to update cyber security requirements in § 73.54, “Protection of digital computer and communication systems and networks” for nuclear power reactor licensees. This update would clarify the cyber security requirements applicable to a nuclear power reactor during each stage of the decommissioning process.

As stated in § 73.54, applicants and licensees must provide high assurance that their digital computer and communication systems and networks associated with safety and important-to-safety, security, and emergency preparedness (SSEP) functions are adequately protected against cyber attacks, up to and including the design basis threat described in § 73.1, “Purpose and scope.” To accomplish this, each holder of a nuclear power reactor operating license under 10 CFR part 50 has submitted a cyber security plan (CSP) to the NRC that has been approved by the NRC. Further, each combined license (COL) applicant is required to submit its CSP as part of its COL application for review and approval. Each approved CSP is referenced in a license condition in each 10 CFR part 50 license, and this license condition requires a licensee to maintain its CSP until the license is terminated or the license condition is removed by license amendment. A COL holder does not have an equivalent cyber security license condition.

The cyber security requirements in § 73.54 apply to licensees currently licensed to operate a nuclear power plant. Once the NRC has docketed a licensee’s § 50.82(a)(1) or § 52.110(a) certifications, that licensee is no longer authorized to operate a nuclear power plant. Therefore, the requirements in § 73.54 would no longer apply to such a licensee. However, each 10 CFR part 50 licensee has a license

condition requiring the licensee to maintain its CSP, and this license condition remains in effect during decommissioning. A COL holder, without the license condition, is not required to maintain its CSP when it begins decommissioning.

Although a licensee that has submitted its § 50.82(a)(1) or § 52.110(a) certifications is no longer operating, such a licensee may still have fuel recently removed from the reactor vessel in its SFP. As discussed in the “*Technical Basis for Graded Approach*” section of this document, if the spent fuel in the SFP has not sufficiently decayed, there is a risk that the spent fuel could heat up to clad ignition temperature and lead to a zirconium fire for postulated draindown scenarios in a timeframe that is too short to reliably implement mitigation measures or to take other appropriate response actions.

As discussed in the “*Technical Basis for Graded Approach*” section of this document, in Level 2 there is little chance that the spent fuel in the SFP could heat up to clad ignition temperature within 10 hours. Accordingly, the NRC is proposing that the cyber security requirements in § 73.54 continue to apply to licensees through Level 1. This continuation of the cyber security requirements would ensure that a compromise of digital systems cannot adversely impact the effective operation of the licensees’ physical security programs and emergency preparedness functions prior to the time at which the spent fuel cannot reasonably heat up to clad ignition temperature within 10 hours after a draindown event. Although the cyber security requirements would continue to apply through Level 1, the number of critical digital assets would decrease as systems are removed from service, which in turn reduces the number of critical digital assets that must be protected by the CSP.

To clarify the applicability of the cyber security rule to decommissioning nuclear power reactor licensees, the NRC is proposing to add two paragraphs to § 73.54. A new



§ 73.54(i) would state that the requirements of § 73.54 will remain in effect until: (1) the NRC has docketed the licensee's § 50.82(a)(1) or § 52.110(a) certifications, and (2) at least 10 months for a BWR or 16 months for a PWR have elapsed since the date of permanent cessation of operations or an NRC-approved alternative to the 10 or 16 month spent fuel decay period, submitted under proposed § 50.54(q)(7)(ii)(A) and (B), has elapsed. A new § 73.54(j) would state that, after both requirements of § 73.54(i) have been met, the licensee's license condition that requires implementation and maintenance of a cyber security plan would be removed from the license. The NRC is also proposing the removal of the introductory paragraph of § 73.54 in its entirety and revising the language of § 73.54(a), (b), and (c). These are conforming changes to clarify that the applicability of § 73.54 is not limited to "operating" reactors (i.e., that § 73.54 would still be applicable after the NRC has docketed a licensee's § 50.82(a)(1) or § 52.110(a) certifications), to remove language that is no longer needed concerning the initial submission of cyber security plans by existing licensees, and to add clarifying language to § 73.54(b) and (c). Further, the NRC is proposing a change to § 73.55(c)(6), which requires the licensee to establish, maintain, and implement a cyber security plan. This is a conforming change to reflect the scenario in which a decommissioning power reactor licensee is no longer required to maintain a cyber security plan (i.e., the NRC has docketed the certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel, and the fuel in the SFP has sufficiently decayed), but is still required to comply with § 73.55(c).

The proposed revision to § 73.54(a) would not constitute backfitting for 10 CFR part 50 licensees. The proposed revision would constitute a violation of issue finality for COL holders; extending the requirement to maintain a CSP during decommissioning would be a new requirement imposed on COL holders. The NRC's

proposed backfit analysis is located in the “*Backfitting and Issue Finality*” section of this document.

#### **D. Drug and Alcohol Testing**

##### **Scope of 10 CFR part 26**

The NRC is proposing to amend § 26.3, “Scope,” to correct an inconsistency within § 26.3(a) where the FFD requirements in 10 CFR part 26 apply differently to 10 CFR part 50 and 10 CFR part 52 licensees with decommissioning power reactors. The § 26.3(a) provision lists those licensees that are required to comply with designated subparts of 10 CFR part 26, including licensees who are authorized to operate a nuclear power reactor under § 50.57 and holders of a combined license under 10 CFR part 52 after the Commission has made the finding under § 52.103(g). In accordance with this requirement, 10 CFR part 26 does not apply to a holder of a power reactor license issued under 10 CFR part 50 that is no longer authorized to operate a nuclear power reactor because the NRC has docketed the certifications required under § 50.82(a)(1) (i.e., a decommissioning 10 CFR part 50 power reactor licensee). However, 10 CFR part 26 continues to apply to holders of combined licenses issued under 10 CFR part 52 throughout decommissioning. Therefore, there is an inconsistency in the application of FFD requirements to power reactor licensees during decommissioning.

The NRC has determined that there is no technical basis for this inconsistency. In the 1989 10 CFR part 26 final rule (54 FR 24468; June 7, 1989) (1989 FFD Final Rule), the Commission explained that the intent of that rule was to address the potential for worker impairment of any kind, including substance abuse that could affect the safe operation of nuclear power plants. The emphasis throughout the 1989 FFD Final Rule is that the rule is necessary to promote public health and safety when the plant is

operational. The wording for 10 CFR part 52 licensees described in the scope of the 2008 10 CFR part 26 final rule (73 FR 16966; March 31, 2008) (2008 FFD Final Rule), specifically § 26.3(a), was an oversight. The emphasis of the 1989 FFD final rule that FFD need only apply to operating 10 CFR part 50 sites needs to be the same for 10 CFR part 52 licensees. Due to the decreased risk to public health and safety during decommissioning, 10 CFR part 26 should not apply to these licensees during decommissioning.

Therefore, the NRC proposes to clarify that 10 CFR part 26 does not apply to 10 CFR part 52 licensees once the NRC has docketed their § 52.110(a) certifications. Section 26.3(a) of the proposed rule would specify that each holder of an operating license for a nuclear power reactor under 10 CFR part 50 and each holder of a combined license under 10 CFR part 52 for which the Commission has made the finding under § 52.103(g) must comply with the requirements of 10 CFR part 26, except for subpart K of 10 CFR part 26, until the NRC's docketing of the license holder's certifications described in §§ 50.82(a)(1) or 52.110(a).

For clarity, the NRC proposes to divide the current paragraph of § 26.3(a) into two paragraphs. Paragraph (a)(1) would retain the requirement in the second sentence of current § 26.3(a) to state the deadline by which licensees must implement their FFD program. Paragraph (a)(2) would retain the requirement in the first sentence of current § 26.3(a) that these licensees must comply with the requirements of 10 CFR part 26, except subpart K, but clarify that this requirement ends when the NRC docketed the licensee's §§ 50.82(a)(1) or 52.110(a) certifications.

### **Fitness-for-Duty Elements for Insider Mitigation Program**

Under § 73.55(b)(9), a licensee is required to establish, maintain, and implement an IMP to monitor the initial and continuing trustworthiness and reliability of individuals granted unescorted access authorization (UAA) or unescorted access (UA) to a protected area (PA) or vital area (VA).

Section 73.55(b)(9)(ii)(B) requires that an IMP must contain elements of an FFD program described in 10 CFR part 26. However, the regulations do not identify which FFD program elements must be included in the IMP. Section 73.55(b)(9)(ii)(B)(1) and (2) of this proposed rule would amend § 73.55(b)(9)(ii)(B) to establish an appropriate set of FFD provisions to be incorporated into the IMP of operating and decommissioning 10 CFR part 50 and 10 CFR part 52 licensees to provide reasonable assurance that individuals granted UAA or UA to the PA or VA are trustworthy and reliable.

Section 73.55(b)(9)(ii)(B)(1) of this proposed rule would clarify § 73.55(b)(9)(ii)(B) that licensees implementing 10 CFR part 26, regardless of whether they are required to do so, are in compliance with § 73.55(b)(9)(ii)(B). A licensee's full 10 CFR part 26 FFD program (i.e., an FFD program that complies with all applicable 10 CFR part 26 requirements) would contain FFD elements appropriate for inclusion in the licensee's IMP. This would apply to both operating and decommissioning licensees.

Section 73.55(b)(9)(ii)(B)(2)(i) and (ii) of this proposed rule describes the minimum 10 CFR part 26 elements necessary for a 10 CFR part 50 and 10 CFR part 52 decommissioning licensee's IMP. Section 73.55(b)(9)(ii)(B)(2)(i) of the proposed rule states that individuals who have unescorted access to the VAs at a decommissioning site, perform security-related functions (i.e., individuals covered by § 26.4(a)(5)), or administer the drug testing program (i.e., individuals covered by § 26.4(g)) are subject to the requirements in 10 CFR part 26 except for subparts I and K. Individuals who have security-related responsibilities or perform work around the spent fuel pool may have

knowledge of value to an adversary. In addition, security personnel generally carry weapons on site and would pose a significant challenge to site security if they were to perform as an active insider during an attack. Testing of individuals who administer a drug testing program is viewed as essential to the integrity of the program.

Proposed § 73.55(b)(9)(ii)(B)(2)(i) states that individuals who have UA to the protected area, but do not perform security-related functions or administer the drug testing program would still be subject to pre-access and for-cause testing (§ 26.31(c)(1) and (2)) and behavior observation (§ 26.33), but would not be subject to random testing (§ 26.31(c)(5)). The NRC proposes to relax these requirements because while the reactor is in decommissioning the potential contribution of certain personnel to support an adversary as an insider is greatly reduced. Individuals who do not have any security-related responsibilities or regular SFP area UA will have less potential contribution as an insider.

The NRC has determined that the FFD elements necessary for an IMP under this proposed rule are commensurate with the hazard and potential event consequences associated with a facility's operational status. Section 73.55(b)(3) states that the physical protection program must be designed to prevent significant core damage and spent fuel sabotage. Operating reactor facilities contain many target sets located throughout the PA of potential interest to an adversary seeking to affect core damage or spent fuel sabotage, thus anyone who has UAA or UA to the PA could contribute significantly to an adversary.

The hazard and potential event consequences associated with decommissioning facilities significantly decrease in comparison to those associated with the operating facilities. During decommissioning, the SFP becomes the primary focus of the licensee's obligation to protect against the radiological sabotage design basis threat, as it becomes

the location where all spent fuel is located when a nuclear power reactor is no longer operating and prior to transitioning to an ISFSI. With this perspective, this proposed rule tailors applicability of the FFD elements commensurate with the duties and access of personnel who have been granted UAA and maintain UA to the PA or VA.

### **Criminal Penalties**

The NRC proposes to amend the criminal penalties section of 10 CFR part 26 by including § 26.3 within § 26.825(a). Existing § 26.825(a) applies the NRC's authority under the AEA to impose criminal penalties for willful violations of, attempts to violate, or conspiracies to violate NRC regulations. Section 26.825(b) lists § 26.3 as one of the 10 CFR part 26 provisions that is excluded from § 26.825(a). In general, the criminal penalties sections of NRC regulations apply to substantive requirements, and administrative or procedural regulatory provisions are excluded from criminal penalties sections. The current § 26.3 is entitled "Scope" and identifies which entities are within the scope of 10 CFR part 26. Scoping provisions typically do not contain substantive requirements, which may explain why § 26.825(b) includes § 26.3. However, the current § 26.3(a) not only describes the entities that are subject to the requirements of 10 CFR part 26 but also includes a substantive requirement for certain entities to comply with requirements in 10 CFR part 26 by a specific deadline. This requirement was added to § 26.3(a) in the 2008 FFD Final Rule, but § 26.825(b) was not updated to reflect this change, which was an oversight. This proposed rule would not change the substantive requirement in § 26.3(a). Because proposed § 26.3(a) would continue to impose a substantive requirement, the NRC proposes to remove § 26.3 from § 26.825(b), thereby including § 26.3 in § 26.825(a).

## **E. Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor**

The NRC is proposing two revisions to its regulations. The first change would be to amend the definition of a CFH in § 50.2 to provide an alternative that would eliminate the need for licensees to seek NRC approval for fuel handler training programs by adding a provision that requires the training program to address the safe conduct of decommissioning activities, safe handling and storage of spent fuel, and appropriate response to plant emergencies, and specifies that a CFH must be qualified in accordance with a fuel handler training program that meets the same requirements as training programs for non-licensed operators required by § 50.120. This proposal would provide consistency in the regulatory treatment of the training programs for non-licensed operators (which do not require NRC approval) and fuel handler training programs to qualify a non-licensed operator as a CFH (which do require NRC approval). The second change would clarify that an STA is not required for decommissioning reactors. These changes would provide clarity to the CFH's responsibilities and functions and the role of an STA by codifying current licensing practices. This proposed rule would also clarify the management role of the CFH in a manner that is consistent with § 50.54(y) as discussed in section "*B. Physical Security*" in this document.

### **Alternative definition for Certified Fuel Handler**

The current definition of a CFH in § 50.2 does not specify what is in an NRC-approved fuel training program. Licensees have submitted requests for the approval of CFH training and retraining programs in connection with their decommissioning. After receiving NRC approval of a CFH training program, the licensee typically submits another license amendment to propose changes to the Administrative Controls section

of its Technical Specifications (TS) to include a CFH, among other applicable changes based on the approval of the CFH training program.

For example, on May 12, 2014, the NRC approved the Shift Manager/Certified Fuel Handler training program for Kewaunee Power Station (ADAMS Accessions No. ML14104A046). The NRC's safety evaluation supporting approval of the CFH training program used criteria that focused on whether the licensee trained CFHs on the following three objectives: (1) safe conduct of decommissioning activities; (2) safe handling and storage of spent fuel; and (3) appropriate response to plant emergencies. These three objectives have subsequently been the basis for other NRC approvals of CFH training programs for licensees entering or planning to enter the decommissioning process: Entergy for VY (ADAMS Accession No. ML14162A209); Exelon for Oyster Creek Nuclear Generation Station, Clinton Power Station, and Quad Cities Nuclear Power Station (ADAMS Accession No. ML16222A787); and Entergy for FitzPatrick Nuclear Power Plant (ADAMS Accession No. ML16259A347).

In the safety evaluations for those approved CFH training programs, the NRC discusses the 1996 Final Rule and its role in the development of the objectives for an acceptable CFH training program. The NRC recognized that the risks posed at decommissioning reactors are significantly less than those posed by operating reactors. The NRC noted specifically that:

- While the spent fuel is still highly radioactive and generates heat caused by radioactive decay, no neutron flux is generated and the fuel slowly cools as its energetic decay products diminish.
- The systems required for maintaining the spent fuel in the spent fuel pool as well as the operations required to contain the remaining residual contamination in the facility and spent fuel pool are relatively simple.



- Because the spent fuel is stored in a configuration that precludes a nuclear fission reaction, no generation of new radioactivity can occur and the potential for consequences that could result from an inadvertent nuclear reaction are highly unlikely.

Because of the reduced risks and relative simplicity of the systems needed for safe storage of the spent fuel, the NRC explained in the 1996 Final Rule that the degree of regulatory oversight required for a nuclear power reactor during its decommissioning stage is considerably less than that required for the facility during its operating stage. In the 1995 decommissioning proposed rule (60 FR 37374; July 20, 1995), the NRC provided insights as to the responsibilities of the proposed new position of the CFH. Specifically, the NRC stated that a CFH is an individual who has the requisite knowledge and experience to evaluate plant conditions and make judgments about emergency action decisions necessary to protect the public health and safety.

In addition to using the three objectives to evaluate the fuel handler training programs for licensees entering or planning to enter decommissioning, the NRC applied the criteria in § 50.120, "Training and qualification of nuclear power plant personnel," and assessed the proposed fuel handler training programs against the elements of a systems approach to training (SAT) as defined in § 55.4, "Definitions." Section 50.120 identifies individuals required to be subject to an SAT, including non-licensed operators such as CFHs, and necessary elements for training programs. These elements include the requirement to periodically evaluate and revise the training program, as appropriate, to reflect changes to the facility (e.g., decommissioning), procedures, regulations and quality assurance requirements.

Because it has developed succinct criteria to approve fuel handler training programs, the NRC proposes to include this criterion in its regulations as an alternative definition of a CFH to eliminate the need for licensees to submit requests for NRC

approval of CFH training programs. Specifically, the NRC would codify current approval practices by amending § 50.2 to add the three broad-scope objectives as responsibilities for which a CFH must be trained: (1) safe conduct of decommissioning activities; (2) safe handling and storage of spent fuel; and (3) appropriate response to plant emergencies. In addition, the CFH would have to qualify in accordance with a fuel handler training program that meets the same requirements as training programs for non-licensed operators required by § 50.120. Should a licensee not exercise the alternative definition, it would need to submit a request for approval of a fuel handler training program.

#### **Elimination of the Shift Technical Advisor**

The STA is a position identified in licensees' TSs. The STA provides engineering expertise in the diagnosis of complex problems with SSCs during reactor operation. Once a licensee enters the decommissioning process, the STA function is no longer needed. The current regulations do not address the acceptability of discontinuing the STA position for a decommissioning reactor. Licensees have been removing the STA position and replacing that position with a CFH in their TSs through license amendments (see Duke Energy Florida for Crystal River Unit 3 Nuclear Generating Plant (ADAMS Accession No. ML14097A145); Exelon for Oyster Creek Nuclear Generating Station (ADAMS Accession No. ML16235A413); and Entergy for VY (ADAMS Accession No. ML14217A072)). The NRC proposes to revise a footnote to the table titled "Minimum Requirements Per Shift for On-Site Staffing of Nuclear Power Units by Operators and Senior Operators Licensed Under 10 CFR Part 55" in § 50.54(m)(2)(i) to state that an STA is not required upon the NRC's docketing of the license holder's certifications required under §§ 50.82(a)(1) or 52.110(a).

## **F. Decommissioning Funding Assurance**

The NRC proposes to amend its regulations regarding licensees' uses of decommissioning trust funds, modify decommissioning funding reporting requirements, clarify decommissioning funding assurance requirements, and eliminate duplicate regulations.

### **Allow the Use of Decommissioning Trust Funds for Spent Fuel Management and Specific License ISFSI Decommissioning Costs**

The term *Decommission* is defined in the NRC's regulations at § 50.2 as meaning to remove a facility or site safely from service and reduce residual radioactivity to a level that permits: (1) release of the property for unrestricted use and termination of the license; or (2) release of the property under restricted conditions and termination of the license. Therefore, decommissioning, as used in the NRC's regulations, refers to radiological decommissioning. Defining decommissioning as radiological decommissioning is consistent with the NRC's authority under the AEA to regulate source, byproduct, and special nuclear material. Pursuant to § 50.75, "Reporting and recordkeeping for decommissioning planning," specifically paragraph (b)(1), power reactor licensees and applicants must certify that reasonable assurance for radiological decommissioning funding has been (for licensees) or will be (for applicants) provided in an amount that may be more, but not less, than the generic amount provided by the Commission's regulations (i.e., the table of minimum amounts under § 50.75(c)). Alternatively, under § 50.75(b)(4), the certified amount of funding may be based on a site-specific cost estimate for decommissioning the facility. This amount must be covered by one or more of the methods described in § 50.75(e). The NRC is not

proposing to change the methods described in § 50.75(e) as part of this proposed rule. The purpose of the decommissioning funding assurance requirement is to ensure that licensees can provide reasonable assurance that sufficient funds will be available for radiological decommissioning. The funds collected by a licensee to meet the decommissioning funding assurance requirement are known as decommissioning funds and are typically held in an external decommissioning trust fund (DTF), which is segregated from licensee assets and outside the administrative control of the licensee and its subsidiaries or affiliates under § 50.75(e)(1).

Pursuant to § 72.6, “License required; types of licenses,” licenses for the receipt, handling, storage, and transfer of spent fuel are of two types: general and specific. Licensees may provide financial assurance for the decommissioning of general license ISFSIs with funds in their 10 CFR part 50 DTFs because general license ISFSI decommissioning falls under the definition of decommission in § 50.2. However, licensees may not provide financial assurance for the decommissioning of specific license ISFSIs, as addressed in § 72.30, with funds in their 10 CFR part 50 DTFs without the NRC approval of a regulatory exemption.

The NRC proposes to clarify § 50.75(a), (b)(1), (b)(4), (b)(5), and (e)(1) to simplify, but not to change, the initial intention of these regulations, as well as to provide common language throughout the regulations. In § 50.75(a), the NRC would specify the term “decommission” as defined in § 50.2. In § 50.75(b)(1), the general wording would be changed to be consistent with the language in § 50.75(a). In § 50.75(b)(4), the NRC proposes to add language to specify that the site-specific decommissioning cost estimate may be more, but not less, than the amount stated in the table of minimum amounts under § 50.75(c). New paragraph (b)(5) would consist of an existing requirement in paragraph (b)(4). The NRC proposes to move this requirement to new

paragraph (b)(5) to list the requirements separately for clarity. In § 50.75(e)(1), the NRC is proposing to revise the language to be consistent with § 50.75(a). Throughout §§ 50.75, 50.82, and 52.110, the NRC refers to a site-specific decommissioning cost estimate in various ways. The NRC would amend the provisions to standardize the terminology to uniformly apply the term “site-specific decommissioning cost estimate.”

Section 50.75(h) provides that disbursements or payments from the DTF during the operating life of the facility, other than for payment of ordinary administrative costs and other incidental expenses of the fund in connection with the operation of the fund, are restricted to radiological decommissioning expenses. Additionally, under § 50.82(a)(8) and § 52.110(h), prior to the permanent cessation of operations and the permanent removal of fuel from the reactor vessel, up to 3 percent of the generic amount specified in § 50.75 may be used for decommissioning planning. After the permanent cessation of operations and the permanent removal of fuel from the reactor vessel, and commencing 90 days after the NRC has received the PSDAR, an additional 20 percent may be used. A site-specific decommissioning cost estimate must be submitted to the NRC prior to the licensee using any funding in excess of these amounts. Under § 50.82(a)(8)(i) and § 52.110(h)(1), after the permanent cessation of operations and the permanent removal of fuel from the reactor vessel, DTFs may be used by licensees if: (1) their use is for legitimate radiological decommissioning activities; (2) their use will not reduce the value of the DTF below an amount necessary to place and maintain the reactor in a safe storage condition (if needed); and (3) their use does not inhibit the ability of the licensee to complete funding of any shortfalls in the DTF.

The NRC is proposing to amend the regulations in § 50.82(a)(8)(i)(A) and § 52.110(h)(1)(i) to remove the term “legitimate.” This term does not add any substance to the regulations and is potentially confusing. The intent of the regulation is to ensure

that expenses fall within the NRC definition of decommission. Whether an expense falls within the definition of decommission would continue to be determined on a case-by-case basis by the licensee when considering whether to make a withdrawal from the DTF. Since this term is non-substantive, its removal would not change any of the existing requirements regarding the use of decommissioning funds.

In support of decommissioning, licensees have historically requested exemptions from the decommissioning funding assurance requirements to allow for the withdrawal of funds from their DTFs for expenses unrelated to radiological decommissioning activities, such as spent fuel management. Generally, the NRC has granted these exemption requests, on a case-by-case basis, based on a finding of reasonable assurance that, even after the proposed withdrawals of funds for the requested use (e.g., spent fuel management), sufficient funding would remain in the DTF to complete radiological decommissioning.

The NRC is proposing to change its decommissioning funding assurance requirements to allow licensees the option to use DTFs not only for radiological decommissioning costs but also, if certain requirements are met, for spent fuel management and specific license ISFSI decommissioning costs. The use of DTFs for any other non-radiological decommissioning costs, such as for site restoration, would remain prohibited unless a regulatory exemption for such use is sought by a licensee and granted by the NRC. One reason for this distinction is that spent fuel management and specific license ISFSI decommissioning falls within the NRC's jurisdiction under the AEA to regulate source, byproduct, and special nuclear material, whereas other non-radiological decommissioning activities such as site restoration and the removal of chemical and other non-radiological contaminants do not fall under this authority. The use of this option, however, would be predicated on the licensee's ability to fully fund

radiological decommissioning notwithstanding any withdrawals for spent fuel management and specific license ISFSI decommissioning costs. Consequently, this option would be available only to a licensee with a DTF of an amount that exceeds the site-specific amount necessary for radiological decommissioning. Therefore, licensees may voluntarily increase their DTFs to increase the probability that they will be able to use their DTFs for spent fuel management and specific license ISFSI decommissioning costs.

Licensees also continue to have the ability to set aside funds for spent fuel management and ISFSI decommissioning costs outside of the dedicated DTFs established through § 50.75. For instance, some licensees have created separate DTF subaccounts to provide for the funding of activities that do not fall within the definition of decommission in § 50.2, such as for spent fuel management and site restoration activities. The NRC allows such commingling of funds within a licensee's DTF so long as the licensee is able to identify and account for the NRC-required radiological decommissioning funds that are contained within the DTF. The practice of commingling is described in NRC Regulatory Issue Summary 2001-07, "10 CFR 50.75 Reporting and Recordkeeping for Decommissioning Planning," Revision 1 (ADAMS Accession No. ML083440158), dated January 8, 2009.

The NRC proposes to add a new § 50.82(a)(8)(viii) to provide a licensee the option to use its DTF for spent fuel management and specific license ISFSI decommissioning costs only if: (1) the licensee has submitted, and the NRC has docketed, the certifications required under § 50.82(a)(1) ~~or § 52.110(a)~~; (2) 90 days have elapsed since the NRC received the licensee's PSDAR under § 50.82; and (3) the licensee has identified excess funds in the DTF. Such excess funds are funds in the DTF that are greater than those funds reasonably needed to maintain compliance with

§ 50.82(a)(8)(i)(B) and (C), complete radiological decommissioning, and terminate the license. Licensees should indicate their proposed use of this funding option in the site-specific decommissioning cost estimate and clearly identify any excess funds. In addition, licensees should identify the availability of excess funds in the annual decommissioning financial assurance status report required under § 50.82(a)(8)(v). Regardless of whether this option is exercised, a licensee would be required to continue with a series of steps, as specified in § 50.75(a), to comply with all decommissioning funding assurance regulations. A licensee would not be relieved of the responsibility to certify that there is reasonable assurance that decommissioning funding will be available.

### **Changes to Reporting Requirements**

In the “Financial Assurance Requirements for Decommissioning Nuclear Power Reactors” final rule (63 FR 50465; September 22, 1998), the NRC added the requirements currently in § 50.75(f)(1) and (2) that each power reactor licensee must file a report with the NRC on the status of its decommissioning funding for each reactor that it owns, by March 31st of every odd-numbered year or annually for plants that are within five years of their projected end of operation. This report must specify: (1) the amount of decommissioning funds estimated to be required pursuant to § 50.75(b) and (c); (2) the amount of decommissioning funds accumulated to the end of the calendar year preceding the date of the report; (3) a schedule of the annual amounts remaining to be collected; (4) the assumptions used regarding rates of escalation in decommissioning costs, rates of earnings on decommissioning funds, and rates of other factors used in funding projections; (5) any contracts upon which the licensee is relying; (6) any



modifications occurring to a licensee's current method of providing financial assurance since the last submitted report; and (7) any material changes to trust agreements.

The NRC is proposing to change the reporting frequency in § 50.75(f)(1) to coordinate the reporting frequency with the ISFSI decommissioning reporting frequency in § 72.30. This change would convert the biennial decommissioning funding status report required for 10 CFR part 50 and 10 CFR part 52 power reactor licensees to a triennial decommissioning funding status report as currently is required for 10 CFR part 72 ISFSI licensees. This revision would not change the annual reporting frequency for a reactor licensee that is within 5 years of its projected end of operations, whether that projection is based on the license's expiration date or on a premature shutdown, and would not change the annual reporting frequency for a reactor that has permanently ceased operations. Also, the change in reporting frequency would not relieve the licensee from calculating annual adjustments as required under § 50.75(a)(2) and would not affect the Table of Minimum Amounts in § 50.75(c) or its escalation factors. Therefore, a licensee would be required to continue to monitor its decommissioning funding on an annual basis but instead of reporting every 2 years to the NRC, it would report every 3 years.

Since 1999, the NRC's regulations have mandated that licensees report to the NRC the status of their decommissioning funding. Under § 50.75(f)(1), the biennial decommissioning funding status report requires the disclosure of seven items, including the balance of the DTF as of December 31st of the prior year. Over these 19 years, the NRC conducted spot checks of licensee records related to this information. The NRC did not identify any major discrepancies related to this information, as explained in SECY-15-0005 (ADAMS Accession No. ML14210A554), dated January 15, 2015. Therefore, the NRC has confidence that changing from a biennial to a triennial reporting

frequency will not subject the public to any additional risks associated with decommissioning funding assurance. In addition, even with a triennial reporting frequency, there would be ample time to resolve any decommissioning funding issue. Furthermore, the proposed revision does not change the requirement for more frequent reporting as a licensee approaches the permanent cessation of operations and while the licensee is in decommissioning or the requirement for a site-specific decommissioning cost estimate during this period.

The NRC proposes a rule change in § 50.75(h) in order to be consistent with the requirements of § 50.4. Specifically, notifications would be sent directly to the Document Control Desk, and not to the Director, Office of Nuclear Reactor Regulation, Director, Office of New Reactors, or Director, Office of Nuclear Material Safety and Safeguards, as applicable. This change would provide one consistent location for licensees to docket all notifications to the NRC.

The NRC proposes to delete § 50.75(f)(2). The language of existing § 50.75(f)(1) fully encompasses the language of paragraph (f)(2), and, therefore, paragraph (f)(2) is unnecessary and potentially confusing. By removing paragraph (f)(2) the NRC would not be removing the requirement on licensees to continue submitting decommissioning funding assurance status reports. Existing paragraphs (f)(3) through (5) would be redesignated as paragraphs (f)(2) through (4).

### **Shortfalls in Decommissioning Funding Assurance**

The requirement in § 50.75 that the licensee provide reasonable assurance that sufficient funds will be available for radiological decommissioning is a continuing obligation. However, economic factors can cause the amount of a licensee's financial assurance to fall below the amount required (either by the NRC minimum formula in

§ 50.75(c), or by a licensee's site-specific decommissioning cost estimate), thereby creating a shortfall. The regulations do not explicitly discuss what to do when a licensee faces a funding shortfall, regardless of its cause. Instead, the NRC addressed the scenario in its guidance in RG 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors" (ADAMS Accession No. ML003740066). This guidance provides that non-rate-regulated licensees should make up shortfalls in decommissioning funding within 2 years and electric utility licensees within 5 years.

The NRC is proposing to amend its regulations in § 50.75(f)(1) to clarify that, although the regulations establish a continuing obligation to provide reasonable assurance of decommissioning funding, when a licensee identifies a shortfall in the report required by § 50.75(f)(1), the licensee must identify additional financial assurance to cover the shortfall in the next report. Specifically, the proposed rule would require licensees to remedy shortfalls before permanent cessation of operations consistent with the methods identified in § 50.75(e) in the next § 50.75(f) report. The proposed rule would clarify the expectations for how reasonable assurance of funds will be available for the decommissioning process. For electric utilities that currently submit biennial reports but correct their shortfalls within 5 years, the NRC proposes that they would submit their decommissioning funding status reports triennially and explain in their reports how they plan to correct any existing shortfall. Electric utilities should continue to correct shortfalls within 5 years as explained in RG 1.159. For non-rate-regulated licensees that currently submit biennial reports and should correct shortfalls within a 2 year period, the NRC proposes that they correct any shortfalls within the 3 year reporting period. The NRC proposes to clarify the last sentence of current § 50.75(f)(1) to reduce the number of clauses and enhance readability.

The NRC proposes to revise § 50.82(a)(9)(ii)(F) to require licensees to identify the specific sources of funds for “remaining decommissioning costs,” including sources of funds for license termination, spent fuel management, and ISFSI decommissioning.

### **Conforming Changes to 10 CFR Part 52**

The NRC proposes to revise § 52.110 to make the same changes proposed in § 50.82 for the reasons previously discussed and for consistency. In addition, the NRC proposes to add paragraphs (h)(5) through (h)(7) with site-specific decommissioning cost estimate reporting requirements that are identical to the requirements in § 50.82(a)(8)(v) through (vii). Consistent with proposed § 52.110(h)(7), a report on irradiated fuel should only be submitted if irradiated fuel is on site.

### **Change to 10 CFR Part 72**

The NRC proposes to revise § 72.30 so that the submittals subsequent to the initial decommissioning funding plan would no longer require NRC approval. The NRC found little benefit in approving subsequent decommissioning funding plans for ISFSIs because the financial assurance mechanisms employed are very similar to those used for power reactors. The experience to date is that decommissioning funding plans have not changed substantively because of the passive nature of the ISFSI design, the static nature of ISFSI operations after loading, and the fact that there are no liquids or liquid effluents present in dry cask storage facilities. In addition, the NRC expects that the frequency of events that could potentially impact the decommissioning funding plan (i.e., due to spills, facility modifications, or changes in possession limits that are cited in § 72.30(c)) would continue to be low. However, if they were to occur, it is important that these events be factored into the cost of decommissioning. This change would make

the processes under § 72.30(c) more efficient and less burdensome to the licensee and the NRC, while still maintaining reasonable assurance of adequate funding for the decommissioning of ISFSIs.

## **G. Offsite and Onsite Financial Protection Requirements and Indemnity**

### **Agreements**

The NRC proposes to amend its financial protection regulations under 10 CFR part 140, “Financial Protection Requirements and Indemnity Agreements,” and § 50.54(w) to address instances where a decommissioning reactor licensee may not need to maintain its full amounts of offsite liability insurance and onsite property insurance. Reductions in insurance amounts may be warranted commensurate with the reduction in probability of an incident at a reactor in decommissioning, and also a reduction in the offsite and onsite consequences from this event. The proposed financial protection requirements would codify the approach currently used by the NRC to approve exemptions from the financial protection requirements for decommissioning 10 CFR part 50 and 10 CFR part 52 power reactor licensees. The proposed changes would also increase efficiency and transparency in this area by clarifying the requirements for financial protection of decommissioning plants, providing for regulatory certainty, and reducing regulatory burden without affecting public health and safety. Specifically, these proposed requirements would represent a graded approach, including the criteria to be considered, where the financial protection requirements for decommissioning sites are adjusted commensurate with the level of risk posed at two stages of the decommissioning process.

Proposed revisions to 10 CFR part 140 and § 50.54(w) would also address other regulatory topics including, for example, the applicability of procedures regarding

extraordinary nuclear occurrences and a proposed new notification requirement for licensees when they make changes to the amount of onsite insurance.

**Proposed Revisions to Offsite Liability and Onsite Property Insurance Requirements**

The NRC proposes to allow 10 CFR part 50 and 10 CFR part 52 power reactor licensees in decommissioning to reduce the offsite liability and onsite property insurance amounts that they are required to maintain under §§ 140.11 and 50.54(w), respectively, without obtaining exemptions from the NRC’s regulations. Instead, as proposed under §§ 140.11(a)(5) and 50.54(w)(5), once certain criteria are satisfied, licensees could reduce their financial protection to the amounts in Level 2 in Table 3:

**Table 3 - Two-Step Graded Approach**

<b>Level</b>	<b>Reactor Site Description</b>	<b>Offsite Requirement (§ 140.11)</b>	<b>Onsite Requirement (§ 50.54(w))</b>
1	Operating or Permanently Ceased Operations and Permanently Defueled	\$450 million; participation in the industry retrospective rating plan	\$1.06 billion
2	Sufficiently Decayed Fuel; ≥1,000 gallons of radioactive waste	\$100 million; withdrawal from the industry retrospective rating plan	\$50 million

Licensees in Level 1 of the graded approach would be required to maintain the full amounts of offsite liability and onsite property insurance currently required in §§ 140.11(a)(4) and 50.54(w), respectively, until the probability of a zirconium fuel cladding fire in the spent fuel pool is minimized. Maintaining the full level of insurance recognizes the potential for liability insurance claims following an accident of this type and the need for available resources to clean up the site.

The transition to Level 2 financial protection amounts for licensees would be optional and could occur after the passage of a specified amount of time (i.e., 10 months for BWRs or 16 months for PWRs, beginning on the date of permanent cessation of operations, plus the NRC's docketing of the certifications required by § 50.82(a)(1) or § 52.110(a) or after the lapse of an NRC-approved alternative time period to the 10 or 16 month spent fuel decay period that is submitted under § 50.54(q)(7)(ii)(A) and (B)). For the latter option, licensees would need to submit an analysis that demonstrates a reduced risk of a zirconium fuel cladding fire in the SFP. The reduction in the financial protection amounts as identified in Table 3 (i.e., \$100 million in offsite liability insurance and withdrawal from the industry retrospective rating plan) was modelled on the offsite liability claims experience from the accident at Three Mile Island Unit 2 as documented in SECY-93-127, "Financial Protection Required of Licensees of Large Nuclear Power Plants During Decommissioning" (ADAMS Accession No. ML12257A628). SECY-93-127 provides a reasonable basis for using the Three Mile Island Unit 2 experience as a model for determining the appropriate liability insurance coverage level for a permanently shutdown reactor that has completed its respective spent fuel cooling period. Additionally, as documented in SECY-93-127, the reduced onsite financial protection amount in Table 3 (i.e., \$50 million in onsite property insurance coverage) was modelled on the potential onsite cleanup costs from a radiological incident involving the rupture of a large liquid radioactive waste storage tank (~450,000 gallons) containing slightly radioactive water. This event was selected as conceivable and a bounding scenario having negligible radiological consequences offsite.

The spent fuel heat-up analysis performed by the licensee for purposes of reducing its insurance amounts to those in Level 2 could be the same analysis that the licensee performs to relax the offsite emergency planning requirements under proposed

§ 50.54(q)(7)(ii)(A) and (B). The transition to Level 2 would prompt the licensee to notify the NRC under § 140.15(e) of a material change in financial protection—a reduction in offsite primary financial protection from \$450 million to \$100 million and withdrawal from the industry retrospective rating plan. The NRC proposes a conforming change to § 50.54(w) for a similar notification of a material change to onsite property insurance amounts.

### **Proposed Revision to Extraordinary Nuclear Occurrences Requirements**

The NRC proposes to amend its regulations in § 140.81, “Scope and purpose,” to clarify the applicability of the requirements for an Extraordinary Nuclear Occurrence (ENO) to reactors in decommissioning. Under Sections 11 and 170 of the AEA, and NRC regulations at subpart E, “Extraordinary Nuclear Occurrences,” to 10 CFR part 140, the NRC is authorized to make a determination as to whether an event at a production or utilization facility causing a discharge or dispersal of source, special nuclear, or byproduct material that has resulted or will result in substantial damages to offsite members of the public or property, is an ENO. An event will qualify as an ENO if the NRC determines that the criteria in § 140.84, “Criterion I – Substantial discharge of radioactive material or substantial radiation levels offsite,” and § 140.85, “Criterion II – Substantial damages to persons offsite or property offsite,” have been met.

The NRC recognizes that the radiological consequences resulting from an accident at a decommissioning reactor in Level 1 can be similar to those from an accident at an operating reactor. As presented in NUREG-1738, in the timeframe beginning immediately after the reactor is defueled and the fuel placed in the SFP, the radiological consequences of a zirconium fire may be comparable to those from operating reactor postulated severe accidents. The existing potential consequences



from a zirconium fire, until the fuel in the SFP has sufficiently decayed, provides the basis for the NRC's proposal to amend its regulations to include plants in decommissioning within the scope of § 140.81.

#### **Proposed New Rule Language in § 50.54(w)(6)**

The NRC proposes to amend § 50.54(w) to require a prompt notification to the Commission of any material change in proof of onsite property insurance filed with the Commission under 10 CFR part 50. Specifically, the transition to Level 2 as proposed by the NRC would prompt the licensee to notify the NRC under § 50.54(w)(6) of a reduction in onsite property insurance from \$1.06 billion to \$50 million. This proposed amendment to § 50.54(w)(6) would be a conforming change, for consistency, with the existing offsite financial protection requirements under § 140.15(e).

### **H. Environmental Considerations**

#### **Clarifying Changes to 10 CFR Parts 50 and 52**

A power reactor licensee's transition from operating to decommissioning status does not involve an agency action that would trigger NRC responsibilities under environmental statutes, such as the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), or the National Historic Preservation Act (NHPA). However, § 50.82(a)(4)(i) (for power reactors licensed under 10 CFR part 50) and § 52.110(d)(1) (for power reactors licensed under 10 CFR part 52) require that PSDARs provide the reasons for concluding that appropriate previously issued environmental impact statements (EIS) will bound the environmental impacts associated with site-specific decommissioning activities. After the PSDAR is submitted, the licensee must remain in compliance with § 50.82(a)(6)(ii) or § 52.110(f)(2), as applicable. These

regulations state that licensees may not perform any decommissioning activities, as defined in § 50.2, that result in significant environmental impacts not previously reviewed. As explained in the 1996 Final Rule, the requirement in § 50.82(a)(6)(ii) functions as a prohibition against the licensee performing a decommissioning activity that would result in a significant impact “not previously reviewed” (61 FR 39283, 39286, and 39291; July 29, 1996). The NRC may develop updates to IMC 2561, “Decommissioning Power Reactor Inspection Program,” and the related Inspection Procedure (IP) 71801, “Decommissioning Performance and Status Review at Permanently Shutdown Reactors,” dated August 11, 1997 to provide guidance on inspections for compliance with § 50.82(a)(6)(ii) or § 52.110(f)(2) with respect to environmental reviews.

In certain circumstances, licensees may be unable to satisfy the requirement that licensees conclude in the PSDAR that all environmental impacts associated with site-specific decommissioning activities will be bounded by previous environmental impact statements. For example, NUREG-0586, Supplement 1, Volumes 1 and 2, “Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors” (Decommissioning GEIS) (ADAMS Accession No. ML023470327) identified several resource areas that were not generically resolved. If the environmental impact statements previously prepared for the construction and initial operation of the plant, for license renewal, or for another licensing action did not include site-specific analyses for those resource areas not generically resolved under the Decommissioning GEIS, then the licensee would be unable to make the determination in the PSDAR that all impacts will be bounded. Therefore, the licensee would have to either change its planned decommissioning activities so that the impacts would be bounded or submit and have approved a license amendment request

or an exemption request to satisfy § 50.82(a)(4)(i) or § 52.110(d)(1) prior to conducting the subject decommissioning activity.

The NRC proposes to change the PSDAR requirements in § 50.82(a)(4)(i) and § 52.110(d)(1) to require that licensees provide the basis for determining whether the environmental impacts from site-specific decommissioning activities are bounded by previous environmental reviews. This proposed rule change would clarify that licensees, at the PSDAR stage, are required to evaluate the environmental impacts and provide in the PSDAR the basis for whether the proposed decommissioning activities are bounded by previously issued, site-specific or generic environmental reviews. Licensees would no longer be required to make the definitive conclusion that impacts will be bounded. Instead, they would have the flexibility to address any unbounded environmental impacts closer to, but still prior to, the decommissioning activity being undertaken that could cause the unbounded impact. This proposed change would be consistent with the purpose of the PSDAR, as noted in RG 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report" (ADAMS Accession No. ML13140A038), as a mechanism for NRC oversight because it would alert the NRC to any potentially unbounded environmental impacts associated with planned site-specific decommissioning activities. If a licensee were to consider a proposed decommissioning activity that would otherwise be prohibited by § 50.82(a)(6)(ii) or § 52.110(f)(2), then prior to undertaking that activity, the licensee could submit a request for a license amendment or an exemption request, decide not to perform the proposed activity, or modify the proposed activity so that the significant environmental impact does not occur. If the licensee chose to submit a license amendment or exemption request, then the request would trigger NRC responsibilities under environmental statutes. In addition, prior to performing a decommissioning activity that is inconsistent with the PSDAR but

permitted by § 50.59, the licensee must notify the NRC in writing, with a copy to the affected States, in accordance with § 50.82(a)(7). This § 50.82(a)(7) requirement is in the current regulation and would not be changed in this proposed rule.

The NRC also proposes to change the § 50.82(a)(4)(i) and § 52.110(d)(1) regulations to allow licensees to use appropriate federally issued environmental review documents prepared in compliance with NEPA, ESA, NHPA, or other environmental statutes instead of only environmental impact statements. One reason for replacing the phrase “previous environmental impact statements” with “federally issued environmental review documents” is the NRC can, in many instances, satisfy its NEPA compliance obligations by the preparation of an environmental assessment or through a categorical exclusion finding rather than preparing the more complex, time-consuming, and expensive environmental impact statement. A second reason is that this change allows licensees to use a wider range of documents that address various resources. Examples of appropriate federally issued environmental review documents include environmental assessments prepared for license amendments such as extended power uprates; documents prepared during Section 7 consultations under the ESA such as biological opinions and biological assessments; or programmatic agreements prepared through Section 106 consultations under the NHPA to resolve impacts to historic properties. Environmental review documents prepared by other Federal agencies could also be used if they were relevant to the impacts associated with the site specific decommissioning activities.

The regulations in § 50.82(a)(6)(ii) and § 52.110(f)(2) prohibit a licensee from undertaking a decommissioning activity that would result in a *significant* environmental impact not previously reviewed. The NRC is also proposing to change § 50.82(a)(6)(ii) and § 52.110(f)(2) to clarify that the previous review of any potentially significant

environmental impact must be bounded by appropriate federally issued environmental review documents prepared in compliance with NEPA, ESA, NHPA, or other environmental statutes. In this regard, the determination of significance should be made in terms of the appropriate federal environmental resource protection statute. For example, if a proposed decommissioning activity were likely to result in a potential adverse effect upon a historic property, as the term “adverse effect” is described in the Advisory Council on Historic Preservation regulation, 36 CFR 800.5, “Typical classes of action,” then that potential adverse effect would most likely be equivalent to a potential significant impact under § 50.82(a)(6)(ii) or § 52.110(f)(2). Similarly, for species listed under the ESA, the equivalent threshold would be a proposed decommissioning activity that could result in a “take,” as that term is defined in 16 U.S.C. § 1532(19), of any listed species at the time of the proposed decommissioning activity.

These proposed changes would reduce the regulatory burden on the licensee by removing the duplicative requirement to address unbounded environmental impacts at the PSDAR stage. Instead, licensees would only prepare an environmental report or provide other information as requested by the NRC under § 51.41, “Requirement to submit environmental information,” before performing any decommissioning activity that is likely to result in a significant impact not previously bounded.

### **Consistency Changes to 10 CFR Part 51**

Currently, § 51.53(d) requires that an applicant for a license amendment authorizing decommissioning activities for a production or utilization facility either for unrestricted use or continuing use restrictions submit an environmental report. The regulation at § 51.95(d) states that the NRC will prepare a supplemental EIS or an

environmental assessment in connection with an amendment of a license to authorize decommissioning activities.

The 1996 Final Rule eliminated the requirement for power reactor licensees to seek NRC authorization for decommissioning. Therefore, there was no need for licensees to submit a license amendment, or to prepare and submit a supporting environmental report, and thus no federal action that would require the NRC to prepare a NEPA document. In response to the 1995 decommissioning proposed rule, commenters suggested revisions should be made to then-§ 51.53, "Supplement to environmental report," and then-§ 51.95, "Supplement to final environmental impact statement," to reflect the rule change. However, the NRC at that time decided not to amend the 10 CFR part 51 regulations because non-power reactor facilities were still required to submit a decommissioning plan.

The NRC proposes to revise 10 CFR part 51 to reflect the changes made in the 1996 Final Rule that power reactor licensees are not required to submit license amendment requests for authorization to perform decommissioning activities. In § 51.53(d), the NRC is proposing to remove language referencing an amendment for authorizing decommissioning activities and the requirement to prepare an environmental report for power reactors only. In § 51.95(d), the NRC is similarly proposing to remove language referencing an amendment for authorizing decommissioning activities. The NRC further proposes to revise § 51.95(d) to indicate that the NRC would prepare the necessary NEPA document upon the submittal of an amendment requesting approval of a license termination plan. The NRC also intends to add a cross-reference to § 52.110 in § 51.53, "Postconstruction environmental reports," as reactors licensed under 10 CFR part 52 will perform decommissioning under § 52.110, not § 50.82.

The NRC is not proposing to make any changes in 10 CFR part 51 that would impact non-power production or utilization facilities (e.g., research and test reactors) or fuel reprocessing plants. Non-power production or utilization facility and fuel reprocessing plant licensees must continue to submit a license amendment requesting approval for a decommissioning plan and to prepare and submit the appropriate supporting environmental report, and the NRC would continue to prepare the appropriate NEPA documentation.

### **I. Record Retention Requirements**

The NRC's regulations require power reactor licensees to retain the records associated with certain SSCs until the license is terminated, and sometimes require that these records be kept in duplicate. To decrease the burden associated with long-term record storage and increase the overall efficiency of the decommissioning process, licensees that are transitioning to decommissioning frequently request exemptions from these requirements. Although this approach continues to meet the underlying purpose of the recordkeeping regulations, the process of preparing, submitting, and reviewing exemptions from the record retention requirements is not an efficient use of NRC or licensee resources given the fact that the subject records are no longer needed to support any NRC-regulated function. In addition, maintaining the current regulations with respect to record retention during decommissioning can create a situation wherein the facilities used to store records are ready to be dismantled in support of site decommissioning before the necessary exemptions can be processed. The NRC proposes to resolve these issues by amending its regulations in this rulemaking. The recordkeeping requirements at issue include the following:

- General Design Criterion 1, “Quality Standards and Records,” of appendix A to 10 CFR part 50 requires licensees to retain certain records throughout the life of the reactor unit.

- Criterion XVII, “Quality Assurance Records,” of appendix B, “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants,” to 10 CFR part 50 requires licensees to retain certain records consistent with regulatory requirements for a duration established by the licensees.

- Sections 50.59(d)(3) and 52.63(b)(2) require licensees to maintain certain records until termination of a license issued under 10 CFR part 50 or 10 CFR part 52.

- Section 50.71(c) requires licensees to maintain certain records consistent with various elements of the NRC regulations, facility TSSs, and other licensing basis documents.

- Section 72.72(d) requires licensees to duplicate certain records of spent fuel and high-level radioactive waste and store them in a separate location sufficiently remote from the original records so that a single event would not destroy both sets.

Licensees that have previously requested exemptions from these requirements used the justification that, when the SSCs associated with these records are removed from service and the licensing basis documents, the SSCs will no longer serve any NRC-regulated function. Therefore, the need to retain the records will be eliminated. In addition, several licensees requesting an exemption from the requirements of § 72.72(d) used the justification that they will store the ISFSI spent fuel records using the same procedures and processes used for the facility spent fuel (and other) records, which are typically stored in accordance with the NRC-approved quality assurance program (QAP).



The NRC granted the previous record retention exemptions based on a finding of reasonable assurance that the licensee would continue to meet the underlying purpose of the recordkeeping regulations, which is to establish the minimum retention periods necessary for the NRC to ensure compliance with the safety and health aspects of the nuclear environment and for the NRC to accomplish its mission to protect the public health and safety. In “Retention Periods for Records; Final Rule” (53 FR 19240; May 27, 1988), the Commission explained that requiring licensees to maintain adequate records assists the NRC in judging compliance and noncompliance, to act on possible noncompliance, and to examine facts as necessary following any incident. Because the SSCs that were safety-related or important to safety during reactor operations or operation of the SFP are removed from the licensing basis, and subsequently removed from the plant during the decommissioning process, the records associated with those SSCs are no longer required to achieve the purpose of the recordkeeping and record retention regulations.

Records associated with SSCs that maintain compliance with requirements or that protect public health and safety during the decommissioning process have been excluded from these exemptions. Examples include those SSCs associated with programmatic controls pertaining to residual radioactivity, security, and quality assurance (QA), and those SSCs associated with spent fuel assemblies or the SFP (while assemblies are still in the pool) and ISFSIs. These exemptions do not affect the record retention requirements of § 50.75 or any other requirements of 10 CFR part 50 that apply to decommissioning.

Based on these exemptions, the NRC proposes to change the recordkeeping and record retention requirements such that once the NRC docket a licensee’s notifications of permanent cessation of operation and permanent removal of fuel from

the reactor vessel under § 50.82(a)(2) or § 52.110(a), licensees can then eliminate records associated with SSCs that no longer serve any NRC-regulated function. The NRC would allow this record disposal as long as appropriate change mechanisms, such as the § 50.59 evaluation process or NRC-approved TS changes, are used to assess the removal of those records to determine that elimination of the records would have no adverse impact on public health and safety.

The records that would be subject to removal are associated with SSCs that had been important to safety during reactor operation or operation of the SFP, but that are no longer capable of causing an event, incident, or condition that would adversely impact public health and safety, as evidenced by their appropriate removal from the licensing basis documents. Since the SSCs no longer have the potential to cause these scenarios, it is reasonable to conclude that the records associated with these SSCs would not reasonably be necessary to assist the NRC in determining compliance, taking action on possible noncompliance, and examining facts following an incident. Therefore, retention of such records would not serve the underlying purpose of the recordkeeping regulations.

The NRC proposes to make the following five changes to the recordkeeping and record retention requirements to enhance the efficiency of the decommissioning regulations:

1. Amend appendix A to 10 CFR part 50, General Design Criterion 1, to clarify that appropriate records of the design, fabrication, erection, and testing of SSCs important to safety need to be maintained under the control of the licensee until the NRC docket the appropriate decommissioning certifications and until the licensee concludes that the SSCs will no longer serve any NRC-regulated purpose during decommissioning.

2. Clarify in RG 1.184, "Decommissioning of Nuclear Power Reactors," that the requirements in appendix B to 10 CFR part 50, Criterion XVII, concerning record retention, such as duration, location, and assigned responsibility, continue to be met with the recommended changes to the recordkeeping and record retention requirements.
3. Amend § 50.71(c) to specify that licensees for which the NRC has docketed the certifications required under § 50.82(a)(1) or § 52.110(a) are not required to retain records associated with SSCs that have been removed from service using an NRC-approved change process.
4. Amend §§ 50.59(d)(3) and 52.63(b)(2) to clarify that records of changes in the facility must be maintained until the termination of the license except for records associated with SSCs removed from service using an NRC-approved change process after the NRC has docketed the certifications required under § 50.82(a)(1) or § 52.110(a).
5. Amend § 72.72(d) to allow that records of spent fuel, high-level radioactive waste, and reactor-related greater than Class C (GTCC) waste containing special nuclear material no longer be kept in duplicate, as long as the licensee can demonstrate that it will store the records in the same manner as it would for other QA records using a single storage facility subject to the same procedures and processes outlined in an NRC-approved QAP.

In most cases, an NRC-approved QAP involves document storage requirements that meet American National Standards Institute (ANSI) standard N45 2.9-1974, "Requirements for Collection, Storage, and Maintenance of Quality Assurance Records," which specifies, in part, the design requirements for use in the construction of record storage facilities when the use of a single storage facility is desired. In approving the associated QAP, the NRC typically approves the single facility location used for the storage and maintenance of QA records at the facility, and the licensee typically affirms in the QAP that the record storage facility was constructed and is being maintained to meet the requirements of the NRC-approved QAP.

Records for an ISFSI at a specific facility are typically classified as QA records and include all documents and records associated with the operation, maintenance, installation, repair, and modification of SSCs covered by the QAP. An ISFSI's records also include historical records that have been gathered and collected during plant and ISFSI operations. These records are either required in support of the dry cask storage systems used at the ISFSI or for ultimate shipment of the fuel to a Federal repository. The QAP typically allows the storage of QA records, including ISFSI records, to be done in accordance with ANSI N45 2.9-1974 in a single storage facility designed and maintained to minimize the risk of damage from adverse conditions.

The retention of records required by § 50.59(d)(3); § 52.63(b)(2); § 50.71(c); appendix A to 10 CFR part 50, General Design Criterion 1; and appendix B to 10 CFR part 50, Criterion XVII provides assurance that records associated with SSCs will be

captured, indexed, and stored in an environmentally suitable and retrievable condition. Although licensees retain the records required by their license as the plant transitions from operating conditions to a fully decommissioned state, plant dismantlement obviates the regulatory need for maintenance of most records. As the SSCs already removed from the licensing basis are subsequently dismantled and the need for the associated records is, on a practical basis, eliminated, the proposed rule changes would allow disposal of the records associated with SSCs and historical activities that are no longer relevant and thereby eliminate the associated regulatory and economic burdens of creating alternative storage locations, relocating records, or retaining irrelevant records. The proposed recordkeeping and record retention changes only expedite the schedule for disposition of the specified records. Considering the content of these records, their elimination on an advanced timetable has no reasonable potential of presenting any undue risk to public health and safety. In addition, upon dismantlement of the affected SSCs, the records have no functional purpose relative to maintaining the safe operation of the SSCs, maintaining conditions that would affect the ongoing health and safety of workers or the public, or informing decisions related to nuclear safety and security.

In addition, the proposed change to the portion of § 72.72(d) to no longer require records for spent fuel in storage to be kept in duplicate for the ISFSI, would continue to meet the recordkeeping requirements of appendix B to 10 CFR part 50 and other applicable 10 CFR part 72 requirements for the storage and maintenance of spent fuel records in accordance with an NRC-approved QAP. Specifically, § 72.140(d) states that a QA program that the NRC has approved as meeting the applicable requirements of appendix B to 10 CFR part 50, will be accepted as satisfying the requirements of § 72.140(b) for establishing an ISFSI QA program. However, the licensee must also meet the recordkeeping provisions of § 72.174, "Quality assurance records." In addition,

the proposed rule change would not affect the record content, retrievability, or retention requirements specified in § 72.72, “Material balance, inventory, and records requirements for stored materials,” or § 72.174, such that the licensee will continue to meet all other applicable recordkeeping requirements for the ISFSI and associated special nuclear materials.

In proposing these rule changes, the NRC determined that the process and procedures used to store the ISFSI records (i.e., in accordance with the QAP at a facility designed for protection against degradation mechanisms such as fire, humidity, and condensation) would help ensure that the licensee will adequately maintain the required spent fuel information. Therefore, changes to the duplicate record requirement of § 72.72(d) would not affect public health and safety. In addition, allowing the ISFSI spent fuel records to be stored in the same manner as that of other QA records for the nuclear facility would provide for greater efficiency in the storage of all records once the facility enters the final stages of decommissioning, where only the ISFSI facility would remain after license termination.

## **J. Low-Level Waste Transportation**

Paragraph III.E of appendix G, “Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifests,” to 10 CFR part 20, “Standards for Protection Against Radiation,” contains requirements for investigating, tracing, and reporting shipments of low level radioactive waste (LLW) if the shipper<sup>6</sup> has not received notification of receipt within 20 days after

---

<sup>6</sup> Paragraph III.E of appendix G to 10 CFR part 20 uses the term “shipper,” which the regulation defines to mean “the licensed entity (i.e., the waste generator, waste collector, or waste processor) who offers low-level radioactive waste for transportation, typically consigning this type of waste to a licensed waste collector, waste processor, or land disposal facility operator.”

transfer. In addition, paragraph III.E requires the shipper to report such missing shipments to the NRC. Licensees, primarily those that are involved in the decommissioning process, frequently request an exemption from the requirement related to the 20-day receipt notification window. The NRC proposes to amend this requirement to extend the receipt notification window because such an extension would provide licensees with flexibility while not impacting public health and safety or the common defense and security.

Licensees that have previously been granted these exemptions typically requested extension of the investigation notification window to 45 days using the justification that operating experience indicates that, while the 20-day receipt notification window is adequate for waste shipments by truck, other modes of shipment such as rail, barge, or mixed-mode shipments, such as combinations of truck and rail, barge and rail, and barge and truck shipments, may take more than 20 days to reach their destination due to delays in the route that are outside the shipper's control (e.g., rail cars in switchyards waiting to be included in a complete train to the disposal facility). The NRC granted the previous transportation investigation requirement exemptions based on a finding of reasonable assurance that the shipper would continue to meet the underlying purpose of the LLW transportation regulations—to require the shipper to investigate, trace, and report radioactive shipments that have not reached their destination, as scheduled, for unknown reasons.

Under the current regulations, the shipper must investigate, trace, and report to the NRC any shipments of LLW for which the shipper has not received a notification of receipt within 20 days after transfer unless the shipper receives an exemption from the 20-day receipt notification requirement. The NRC has found that exempting licensees from this requirement does not undermine public health and safety, nor does it increase

any security risk. Further, the preparation and submission of the exemption request, and its review, evaluation, and approval by the NRC, are not efficient uses of NRC or licensee resources.

Specifically, the NRC notes that allowing the receipt notification to be made past 20 days would not impact public health, safety, or security even if the LLW transportation package was situated in a publicly accessible area and waiting for continuing transport to the waste disposal site because: (1) individuals in the vicinity of the LLW transportation package would receive no additional radiological dose above background levels resulting from the disposal container; and (2) the LLW would remain secured in the transportation package until the package can be delivered to the waste disposal site. The NRC also notes that, for LLW waste shipments, most shippers will use an electronic data tracking system interchange or similar tracking systems that allow the carrier to monitor the progress of the shipments daily. Because of the oversight and monitoring of radioactive waste shipments throughout the journey from the nuclear facility to the disposal site, the loss, misdirection, or diversion of a shipment without the knowledge of the carrier or the shipper is unlikely.

Therefore, the NRC proposes to change the requirement for the investigation, tracing, and reporting timeframe for LLW transportation to extend the receipt notification window to 45 days after the shipper transfers LLW from a licensed facility to a disposal site. This change would continue to meet the underlying purpose of appendix G to 10 CFR part 20, paragraph III.E, which requires the shipper to investigate, trace, and report LLW shipments that have not reached their destination, as scheduled, for unknown reasons. Furthermore, by extending the time period for notification of receipt to 45 days before requiring investigation, tracing, and reporting, a reasonable upper limit



on shipment duration, based on operating experience, is still maintained if a breakdown of normal tracking systems were to occur.

In addition, the NRC notes that the current version of appendix G to 10 CFR part 20, paragraph III.E, states that LLW shipments must “be investigated by the shipper if the shipper has not received notification **or** receipt within 20 days after transfer...” (emphasis added). However, the “or” should be an “of” in accordance with the subsequent discussions in 10 CFR part 20 regarding notifications of receipt, as well as the associated exemptions that have been granted in this area. Use of the word “or” is an apparent error in the current regulations and should be changed for consistency and clarity within appendix G to 10 CFR part 20, paragraph III.E. Therefore, the NRC proposes to correct this error as part of this proposed rule.

#### **K. Spent Fuel Management Planning**

The regulation in § 72.218(a) states that the § 50.54(bb) spent fuel management program (i.e., the irradiated fuel management program or IFMP) must include a plan for removing from the reactor site the spent fuel stored under the 10 CFR part 72 general license. The IFMP must show how the spent fuel will be managed before starting to decommission systems and components needed for moving, unloading, and shipping this spent fuel. Section 72.218(b) requires that an application for termination of a reactor operating license submitted under § 50.82 or § 52.110 must also describe how the spent fuel stored under the 10 CFR part 72 general license will be removed from the reactor site. Although § 72.218 states what information the § 50.54(bb) IFMP and the § 50.82 and § 52.110 application for termination of a reactor operating license must include, the regulations in §§ 50.54(bb), 50.82, and 52.110 do not contain this information.

As §§ 50.54(bb), 50.82, and 52.110 do not reflect or otherwise reference the provisions in § 72.218, this causes regulatory uncertainty. The NRC proposes to clarify and align the regulations in §§ 50.54(bb), 50.82, 52.110, and 72.218 to provide regulatory clarity and enhance overall regulatory transparency and openness regarding decommissioning and spent fuel management planning.

### **Requirements for the IFMP in § 50.54(bb) and the PSDAR in § 50.82 and § 52.110**

The PSDAR and IFMP are planning documents for decommissioning and spent fuel management, respectively. The current requirements for the timing of the submittal of the PSDAR and IFMP are similar, as the NRC's regulations recognize that a licensee's ability to plan properly and safely for decommissioning depends on a licensee's ability to manage its spent fuel. Actions to manage spent fuel include activities taken prior to and subsequent to decommissioning. Therefore, a licensee's spent fuel management plans and its decommissioning plans should be consistent.

Because § 50.54(bb) already addresses the topic of spent fuel management planning, the NRC proposes including the § 72.218 provisions in § 50.54(bb) to clarify that the § 50.54(bb) IFMP must be submitted before starting to decommission SSCs needed for moving, unloading, and shipping the spent fuel. The NRC proposes to further restructure § 50.54(bb) to clarify that the IFMP addresses both the safety and financial aspects of managing spent fuel. The IFMP would describe the licensee's planned actions for managing spent fuel, how those actions would be consistent with the NRC requirements for possession of spent fuel, and any actions related to spent fuel management that would require NRC authorization, which is consistent with the current rule language. The IFMP would also describe the projected cost of managing spent fuel and how the licensee would provide funding for the management of the spent fuel, until

title to, and possession of, the spent fuel is transferred to the DOE, which is also consistent with the current rule language. The regulation in § 50.54(bb) would continue to require licensees to notify the NRC of any changes to the IFMP, and the NRC proposes to clarify that the notification must occur before performing any activities involving decommissioning of SSCs needed for moving, unloading, and shipping spent fuel. The regulation in § 50.54(bb) would also continue to require licensees to retain a copy of the IFMP as a record, and the NRC proposes to clarify that the IFMP must be retained until termination of the 10 CFR part 50 or 10 CFR part 52 license.

The NRC also proposes aligning the regulatory process for the IFMP and PSDAR to ensure that the decommissioning and spent fuel management processes are coordinated and consistent, and that licensees undergoing the decommissioning process are taking adequate actions to maintain the appropriate SSCs and capabilities for spent fuel management. The two areas of the PSDAR and IFMP processes that the NRC proposes to better align are: (1) public notification and comment, and (2) level of NRC review.

To align the public notification and comment process between the PSDAR and IFMP, the NRC proposes linking the timing of the IFMP in § 50.54(bb) to no later than the date of submittal of the PSDAR, and referencing the § 50.54(bb) IFMP in the current public notification and comment provision for the PSDAR in § 50.82(a)(4)(ii). Linking the submittal of the IFMP to no later than the submittal of the PSDAR ensures that licensees undergoing the decommissioning process would take adequate actions to maintain the appropriate systems and capabilities for spent fuel management before decommissioning SSCs needed for moving, unloading, and shipping the spent fuel. Referencing the § 50.54(bb) IFMP in the current public notification and comment provision for the PSDAR would extend the public notification and comment to the IFMP.

This would allow for increased transparency and openness in the decommissioning process.

In addition, the NRC receives frequent questions and concerns from various stakeholders about what reactor SSCs are needed for spent fuel management before and at the time of PSDAR submittal and throughout the decommissioning process. Aligning the development of, and public notification and comment on, the IFMP and PSDAR would allow licensees, the NRC, and all stakeholders to better understand those reactor SSCs, if any, that are needed for spent fuel management before they are decommissioned and would improve efficiency of communications with respect to those issues.

The NRC also proposes removing the requirement in § 50.82(a)(4)(i) for the site-specific decommissioning cost estimate submitted with the PSDAR to include the projected cost of managing irradiated fuel. Because the submittal of the IFMP, which specifically includes the projected cost of managing irradiated fuel, will be linked to the submittal of the PSDAR, this projected cost information need not be duplicated in the site-specific decommissioning cost estimate submitted with the PSDAR.

To align the level of NRC review for the PSDAR and IFMP, the NRC proposes to remove § 50.54(bb)'s "preliminary approval" and final NRC review, "as part of any proceeding for continued licensing under 10 CFR part 50 or 10 CFR part 72," of the IFMP. Approval of the IFMP would not be required, just as NRC approval of the PSDAR is not required. In the final rule adopting § 50.54(bb), "Requirements for Licensee Actions Regarding the Disposition of Spent Fuel Upon Expiration of Reactor Operating Licenses" (49 FR 34688; August 31, 1984) (1984 Final Rule), the NRC stated that the IFMP submitted under § 50.54(bb) is part of an information-gathering process that is used by the NRC in determining if it needs to take any further action. The NRC's review

focuses on identification of discrepancies or omissions and its “preliminary approval” signifies that, based on the information available at the time of filing of the IFMP, the licensee’s spent fuel management plans are sound and will provide adequate protection of the public health and safety and the environment. In addition, NRC “preliminary approval” is not a defined process in the current regulatory framework.

The review and “preliminary approval” of the IFMP is similar to the review that the NRC conducts for the PSDAR. The requirements in § 50.82(a)(4) address what information is to be included in the PSDAR submittal. The NRC assesses each PSDAR to determine whether the information in the PSDAR is consistent with the requirements in the decommissioning regulations. If the NRC identifies any deficiencies in the PSDAR, the NRC requests additional information from the licensee. The NRC reviews the additional information from the licensee to ensure that the updated information meets the regulatory requirements for PSDAR content. As necessary, the NRC addresses any further deficiencies with the licensee in subsequent interactions, including additional letters, public meetings, or onsite inspections. Because the IFMP is a planning document like the PSDAR, and the NRC can address any deficiencies in the IFMP with the licensee through its oversight just as the NRC does with the PSDAR, the NRC proposes to align its review of the IFMP with its review of the PSDAR and not require approval of the IFMP.

With regard to NRC’s final review of the IFMP “as part of any proceeding for continued licensing under 10 CFR part 50 or 10 CFR part 72,” these proceedings no longer exist as they did when § 50.54(bb) was first promulgated in 1984. In the 1984 Final Rule, the Commission discussed the “proceeding for continued licensing under part 50” as the pre-1996 reactor decommissioning process, where licensees were required to submit a license amendment request for approval of the decommissioning

plan and to change the license from an operating license to a possession-only license before licensees could begin decommissioning. The NRC noted in the 1984 Final Rule that the IFMP would become part of the conditions of an amended 10 CFR part 50 license for a shutdown reactor facility. After the 1996 rulemaking, the NRC no longer requires submittal of a license amendment when a reactor ceases operations, and thus, there is no longer a “proceeding for continued licensing under part 50” for the NRC to review and approve the IFMP.

The 1984 Final Rule discusses the “proceeding for continued licensing under part 72” as the application for, and NRC issuance of, a 10 CFR part 72 specific license for storage of spent fuel in an ISFSI. The 1984 issuance of § 50.54(bb) preceded the general license ISFSI provisions, which were added to 10 CFR part 72 in 1990. Regarding the 10 CFR part 72 general license, storage of spent fuel in a general license ISFSI is authorized by operation of law via § 72.210, so there is no NRC “licensing proceeding” or approval needed for the 10 CFR part 72 general license. As most reactor licensees use the 10 CFR part 72 general license for storage of spent fuel in an ISFSI, there would be no “proceeding for continued licensing under part 72” for the NRC to review and approve the IFMP.

#### **Requirements in § 72.218 for termination of the general license for spent fuel storage**

Because the current spent fuel management planning provisions of § 72.218 are initiated by reactor shutdown and are related to reactor decommissioning, the requirements fit best in 10 CFR part 50 and are not necessarily needed in 10 CFR part 72. Therefore, as the NRC proposes adding the spent fuel management provisions from § 72.218 into § 50.54(bb), the NRC also proposes deleting those

provisions from § 72.218. In addition, the NRC proposes revising § 72.218 to address requirements related to termination of the 10 CFR part 72 general license, as the current title of § 72.218, "Termination of licenses," suggests.

The 10 CFR part 72 general license is issued to 10 CFR part 50 or 10 CFR part 52 licensees, per the regulation in § 72.210. It follows that the 10 CFR part 72 general license would terminate coincident with the termination of the 10 CFR part 50 or 10 CFR part 52 license. In addition, since the general license ISFSI is part of the 10 CFR part 50 or 10 CFR part 52 licensed site, decommissioning of the general license ISFSI would follow the reactor decommissioning process in § 50.82 or § 52.110, respectively. This approach would also be consistent with the NRC's approach to ISFSI decommissioning funding as discussed in the "*Decommissioning Funding Assurance*" section of this document.

However, to provide regulatory clarity between 10 CFR parts 50, 52, and 72 in terms of decommissioning and termination of the 10 CFR part 72 general license, the NRC proposes to revise § 72.218 to include the following provisions: (1) the general license ISFSI must be decommissioned consistent with the requirements in § 50.82 or § 52.110; and (2) the general license is terminated upon termination of the 10 CFR part 50 or 10 CFR part 52 license. This proposed change would provide regulatory clarity among 10 CFR parts 50, 52, and 72 in terms of decommissioning and termination of the 10 CFR part 72 general license, analogous to the provision in § 72.210 that ties the issuance of the 10 CFR part 72 general license to the existence of the 10 CFR part 50 or 10 CFR part 52 license.

## **L. Backfit Rule**

For nuclear power reactor licensees, the NRC's backfitting provisions are located in § 50.109, "Backfitting," and the issue finality provisions are in 10 CFR part 52 (hereinafter collectively referred to as the "Backfit Rule"). The language of the Backfit Rule clearly applies to a licensee designing, constructing, or operating a nuclear power facility. For example, § 50.109(a)(1) defines "backfitting" to mean changes to, among other things, the procedures or organization required to design, construct or operate a facility. The application of the Backfit Rule to decommissioning plants is not as clear. In SECY-98-253, "Applicability of Plant-Specific Backfit Requirements to Plants Undergoing Decommissioning," dated November 4, 1998 (ADAMS Accession No. ML992870107), the NRC staff presented the Commission with a list of reasons underlying this uncertainty:

- The Backfit Rule has no end point when the rule no longer applies, "thereby implying that backfit protection continues into decommissioning and up to the point of license termination."
- The term "operate" could reasonably be interpreted as including activities to decommission the reactor.
- The Backfit Rule was developed when the decommissioning of plants was not an active area of regulatory concern.
- The Backfit Rule's definition of "backfitting" uses terms associated with the design, construction, and operation of a facility rather than with its decommissioning, although the staff noted in SECY-98-253 that "prior to the 1996 decommissioning rule, the Commission regarded decommissioning as a phase of the plant's life cycle which is different from the operational phase."



- Two of the factors used in evaluating a backfit—costs of construction delay/facility downtime, and changes in plant/operational complexity—are targeted to power operation and are “conceptually inappropriate in evaluating the impacts of a backfit on a decommissioning plant.”

- The SOC for the 1970 (35 FR 5317; March 31, 1970), 1985 (50 FR 38097; September 20, 1985), and 1988 (53 FR 20603; June 6, 1988) final Backfit Rules did not discuss any aspect of decommissioning, focusing instead on construction and operation.

- Proposed changes to decommissioning requirements usually focused on relaxing a requirement or on whether a requirement applicable to an operating reactor continued to be applicable to a decommissioning plant. Thus, “the notion of a ‘substantial increase’ in protection to public health and safety from a backfit does not appear to be particularly useful [in decommissioning].”

- The 1996 Final Rule did not directly respond to questions from the public on the applicability of the Backfit Rule to a decommissioning plant.

Over the years, the NRC has tried to clarify the applicability of the Backfit Rule to power reactor licensees in decommissioning. In SECY-98-253, the NRC staff requested Commission approval to amend § 50.109, among other regulations, so that the Backfit Rule would clearly apply to licensees in decommissioning. In that paper, the NRC staff also proposed that, until the rulemaking was finished, the staff would apply the Backfit Rule to plants undergoing decommissioning “to the extent practical.”

In the February 12, 1999, SRM for SECY-98-253 (ADAMS Accession No. ML003753746), the Commission approved development of a Backfit Rule for plants undergoing decommissioning. The Commission directed the NRC staff to continue to apply the then-current Backfit Rule to plants undergoing decommissioning until issuance

of the final rule. The Commission directed the staff to develop a rulemaking plan, which the staff transmitted to the Commission in SECY-00-0145. In SECY-00-0145, the NRC staff proposed, among other decommissioning-related amendments to its regulations, amendments to § 50.109 to show clearly that the Backfit Rule applies during decommissioning and to remove factors that are not applicable to nuclear power plants in decommissioning. As explained in the section titled “*Actions Leading to this 2018 Proposed Rule*” in this document, the NRC ultimately did not conduct that rulemaking. Therefore, the NRC has continued to apply the Backfit Rule to licensee facilities undergoing decommissioning to the extent practical.

In addition to the Commission direction to clarify the application of the Backfit Rule for decommissioning power reactor licensees, the NRC’s regulatory framework also supports application of the Backfit Rule to power reactor licensees in decommissioning. Under sections 101 and 103a. of the AEA (42 U.S.C. 2131 and 2133a.), the NRC’s issuance of a power reactor operating license under 10 CFR part 50 or a combined license under 10 CFR part 52 grants the holder a license to, among other things, own, possess, and operate a “production facility” or “utilization facility,” as those terms are defined in section 11 of the AEA. Once the licensee under 10 CFR part 50 or 10 CFR part 52 submits its certifications of permanent cessation of reactor operations and permanent removal of fuel from the reactor vessel and the NRC docket those certifications, the licensee is no longer authorized to operate the reactor under § 50.82(a)(2) or § 52.110(b), respectively. The license is no longer an “operating license” for the reactor because the licensee is not operating a production or utilization facility pursuant to sections 101 and 103a. of the AEA. Instead, as described in § 50.51(b) for 10 CFR part 50 licenses and § 52.109, “Continuation of combined license,” for 10 CFR part 52 combined licenses, when the reactor has permanently

ceased operations, the license continues in effect beyond the expiration date and authorizes ownership and possession of the facility until the Commission terminates the license. Thus, when the licensee is no longer authorized to operate the reactor, it retains its possession and ownership authority under its 10 CFR part 50 or 10 CFR part 52 facility license.

Although a decommissioning licensee's license no longer authorizes operation of the reactor because the licensee is not operating a production or utilization facility, the licensee still must "operate" certain SSCs at the site. Under § 50.51(b) (with a similar requirement in § 52.109 for combined license holders), when the licensee has only a possession and ownership license for the reactor, the licensee must not only decommission and decontaminate the facility, but also continue to maintain the facility, including storing, controlling and maintaining the spent fuel in a safe condition. Therefore, power reactor licensees store, control, and maintain spent fuel after permanent cessation of reactor operations through the "operation" of an SFP and ISFSI.

Although § 50.109(a)(1) defines "backfitting" as changes to, among other things, the procedures or organization required to design, construct, or operate a facility, indicating that the Backfit Rule applies only to a holder of a license to "operate a facility," the language of § 50.51(b) shows that "operating a facility" can be interpreted to mean more than just operating a reactor. This is supported by the Commission direction in the SRM for SECY-98-253 that the NRC staff develop a Backfit Rule for plants undergoing decommissioning (i.e., when the licensee no longer operates a reactor) and continue to apply the then-current Backfit Rule to plants undergoing decommissioning until issuance of the final rule. Thus, the Backfit Rule still applies to a licensee that has a license to only possess and own a facility. For a facility in decommissioning, the phrase "operate a

facility” in § 50.109(a)(1) is read to encompass operating the SFP and associated SSCs necessary for compliance with § 50.51(b).

As the Commission and the NRC staff recognized in the 1990s, certain provisions of the Backfit Rule do not clearly apply to power reactor licensees in decommissioning. Currently, guidance in Management Directive 8.4, “Management of Facility-Specific Backfitting and Information Collection,” dated October 9, 2013 (ADAMS Accession No. ML12059A460), provides only that the Backfit Rule applies to decommissioning plants. In this proposed rule, the NRC proposes to complete the process begun two decades ago to clarify the application of the Backfit Rule to power reactor licensees in decommissioning.

The NRC proposes to amend § 50.109 so that power reactor licensees, which have had their § 50.82(a)(1) or § 52.110(a) certifications docketed by the NRC, are the subject of similar backfitting provisions as they were during their operating phase. A new backfitting provision for licensees in decommissioning would eliminate any confusion with the meaning of the words “operate a facility” in § 50.109(a)(1), as compared to other uses of the term “operate” in 10 CFR Chapter I. The current § 50.109 would be limited to licensees of operating reactors, and the new provision would be limited to licensees in decommissioning.

The NRC would make other revisions to § 50.109. To make the section easier to read, the NRC proposes to insert paragraph headings. The NRC would also remove current § 50.109(b) regarding backfits imposed prior to October 21, 1985, because the language is obsolete and no longer needed. ~~In the current § 50.109(a)(6), the NRC proposes to insert a sentence explaining that a documented evaluation, which is used by the NRC to justify not performing a backfit analysis, must include a consideration of the costs of imposing the backfit if the basis for backfitting is bringing a facility into~~

~~compliance with a license or the rules or orders of the Commission, or into conformance with the licensee's written commitments. The Commission provided this direction to the NRC staff in its November 29, 2016, SRM-COMSECY-16-0020 (ADAMS Accession No. ML16334A462).~~

### **M. Foreign Ownership, Control, or Domination**

The NRC is proposing to amend its regulations to address the circumstances when a facility licensed under 10 CFR part 50 or 10 CFR part 52 no longer meets the definition of a utilization facility or a production facility. The AEA has certain requirements specific to utilization or production facilities. By clarifying when a 10 CFR part 50 or 10 CFR part 52 licensed facility is no longer a utilization or a production facility, the NRC can then specify whether these AEA requirements still apply to the licensee for that facility. For instance, the AEA prohibits the issuance of a license for a utilization or a production facility to an entity that the Commission knows or has reason to believe is foreign owned, controlled, or dominated. The Commission's regulations that implement this prohibition, however, are unclear as to whether the prohibition also applies to the acquisition of a 10 CFR part 50 or 10 CFR part 52 license for a facility that is no longer a utilization or a production facility. Therefore, licensees have requested exemptions from § 50.38, "Ineligibility of certain applicants," to transfer 10 CFR part 50 licenses for facilities that no longer meet the definition of utilization facility. The NRC proposes to amend its regulations to clarify that the statutory prohibition only applies to production or utilization facilities, which would eliminate the need for any related exemption requests.

The NRC's regulations in 10 CFR parts 50 and 52 provide for the issuance of a 10 CFR part 50 license for a utilization or a production facility and a 10 CFR part 52 license for a utilization facility. The AEA defines "utilization facility" as:

(1) any equipment or device, except an atomic weapon, determined by rule of the Commission to be capable of making use of special nuclear material in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public, or peculiarly adapted for making use of atomic energy in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public; or (2) any important component part especially designed for such equipment or device as determined by the Commission.

The AEA defines "production facility," in part, as:

(1) any equipment or device determined by rule of the Commission to be capable of the production of special nuclear material in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public; or (2) any important component part especially designed for such equipment or device as determined by the Commission.

As authorized by the AEA, the Commission has issued in its regulations specific definitions for utilization facility and production facility. In § 50.2, a utilization facility is defined generally as a nuclear reactor, which is defined as any apparatus other than an atomic weapon, designed or used to sustain nuclear fission in a self-supporting chain reaction. A production facility is defined as a nuclear reactor designed or used primarily for the formation of plutonium or uranium-233; with certain exceptions not relevant here, a facility designed or used for the separation of the isotopes of plutonium; or, with certain exceptions not relevant here, a facility designed or used for the processing of irradiated materials containing special nuclear material.

NRC case law provides insight as to when a facility licensed under 10 CFR part 50 or 10 CFR part 52 is no longer a utilization or a production facility. In LBP-84-33, *Cincinnati Gas & Electric Co.* (Wm. H. Zimmer Nuclear Power Station,

Unit 1), 20 NRC 765 (1984), an Atomic Safety and Licensing Board granted the licensee's motion to withdraw its application for a 10 CFR part 50 operating license for a nuclear power reactor, despite the fact that the facility was almost completely built. One of the conditions for granting the motion was that the nuclear steam supply system be modified to prevent the facility's operation as a utilization facility. The Board determined that because a utilization facility under the AEA is a facility that is capable of making use of special nuclear material, the facility must be modified to eliminate that capability for it to no longer be categorized as a utilization facility. The Board observed that this can be achieved, for example, by severing and welding caps on main feedwater lines and main steam lines and removing the fuel and the control rod drive mechanisms.

The NRC proposes to add to its regulations language similar to the *Zimmer* decision to establish the criteria for when a facility licensed under 10 CFR part 50 or 10 CFR part 52 no longer meets the statutory or regulatory definition of a utilization or a production facility (i.e., is no longer capable of making use of special nuclear material or of the production of special nuclear material, separation of the isotopes of plutonium, or processing of irradiated materials containing special nuclear material (hereinafter collectively referred to as production-facility activities)). The first criterion is that the facility must not be legally authorized to operate. The second criterion is the physical modification of the licensed facility to be incapable of making use of special nuclear material and of production-facility activities, without significant facility alterations necessary to restore the capability to make use of special nuclear material or to engage in production-facility activities. When a utilization facility is physically modified to be incapable of making use of special nuclear material, it is no longer designed or used to sustain nuclear fission in a self-supporting chain reaction.

Sections 50.82(a)(2) and 52.110(b) already provide for the first criterion for power reactor licensees—that the facility is no longer legally authorized to operate. Sections 50.82(a)(2) and 52.110(b) state, respectively, that a 10 CFR part 50 license and a 10 CFR part 52 license no longer authorize operation of the reactor or emplacement or retention of fuel into the reactor vessel once the NRC has docketed the certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, or when a final legally effective order to permanently cease operations has come into effect. The NRC would amend these regulations to add the second criterion—that the facility licensed under 10 CFR part 50 or 10 CFR part 52 is no longer a utilization facility once the licensee modifies the facility to be incapable of making use of special nuclear material without significant facility alterations.

Because the NRC's regulations do not state when a non-power production or utilization facility or fuel reprocessing plant licensee is no longer authorized to operate (other than at license termination), the NRC proposes to amend § 50.82(b) to add the criteria for when a non-power production or utilization facility or fuel reprocessing plant is no longer a production or utilization facility. The NRC would renumber current paragraph (b)(6) in § 50.82 as paragraph (b)(8) and add new paragraphs (b)(6) and (b)(7). New paragraph (b)(6) would provide that a non-power production or utilization facility or fuel reprocessing plant is not legally capable of operating when the NRC removes the licensee's authority to operate the facility through a license amendment. The NRC can remove a non-power production or utilization facility or fuel reprocessing plant licensee's authority to operate by issuing a possession-only license amendment or by approving the licensee's decommissioning plan through a license amendment, either of which would explicitly remove the licensee's authority to operate. Licensees typically request a possession-only license amendment first and then submit a decommissioning



plan via a second license amendment request. This proposed rule would offer licensees the option to request only one licensing action—the decommissioning plan license amendment—that also would address the licensee’s operating authority, rendering a separate “possession-only license amendment” unnecessary. To address those instances when the licensee is still operating the facility when the licensee submits its decommissioning plan license amendment request, the decommissioning plan license amendment would itself identify the date on which the authority to operate is removed.

The NRC would also include in new § 50.82(b)(6) the second criterion for when the non-power production or utilization facility or fuel reprocessing plant is no longer a production or a utilization facility (i.e., once the licensee modifies the facility to be incapable of production-facility activities and making use of special nuclear material without significant facility alterations).

The NRC would add new § 50.82(b)(7) and amend § 50.82(a)(2) and § 52.110(b) to affirm the continuation of the NRC’s statutory authority over the existing 10 CFR part 50 or 10 CFR part 52 license after the performance of decommissioning activities that lead to the licensed facility no longer meeting the definition of a utilization or a production facility. This facility transition occurs with every licensee during decommissioning: eventually, the facility will be dismantled to the point where it is incapable of making use of special nuclear material or of production-facility activities without significant facility alterations.

Although the facility licensed under 10 CFR part 50 or 10 CFR part 52 may no longer be a utilization or a production facility, the NRC maintains the authority to regulate the existing 10 CFR part 50 or 52 license. A 10 CFR part 50 operating license for a production or utilization facility is issued under AEA sections 103 or 104, and a 10 CFR part 52 combined license for a utilization facility is issued under AEA sections 103 and

185b. That license may contain authorities beyond those governed by 10 CFR parts 50 or 52. Under § 50.52, “Combining licenses,” the Commission may combine in a single license the activities that would otherwise be licensed under separate licenses. Accordingly, a typical 10 CFR part 50 or 52 nuclear power reactor license also includes in a single license the authority under 10 CFR parts 30, 40, and 70 of the NRC’s regulations to perform activities or possess materials authorized by those parts. Parts 30, 40, and 70 of 10 CFR are authorized by sections 81, 63, and 53 of the AEA and concern the licensing of byproduct, source, and special nuclear materials, respectively. A typical 10 CFR part 50 non-power production or utilization facility license also includes the authority under 10 CFR parts 30 and 70 of the NRC’s regulations to perform activities or possess materials authorized by those parts. When the facility is no longer a production or utilization facility, the NRC maintains the authority to regulate the facility and the 10 CFR part 50 or 52 license under a combination of AEA sections 53, 63, 81, and 161. Sections 50.51(b) and 52.109 of the NRC’s regulations also establish that the 10 CFR part 50 or 52 license continues in effect until the NRC terminates the license, notwithstanding the fact that at some point in time during the dismantlement required for license termination, the licensed facility will be disassembled to such an extent that it no longer satisfies the definition of a utilization or a production facility. Therefore, the NRC would amend § 50.82(a)(2), § 50.82(b), and § 52.110(b) to explicitly cite these statutory provisions as the basis for its retention of the authority to regulate the existing 10 CFR parts 50 or 52 facility. The NRC proposes to make conforming changes to the authorities section of 10 CFR parts 50 and 52 to add sections 53, 63, and 81 of the AEA.

The NRC proposes to amend § 50.82(a)(2), § 50.82(b), and § 52.110(b) to state which requirements apply to the existing 10 CFR part 50 or 52 license after the licensed facility is no longer a utilization or a production facility. As provided by section 161b of

the AEA, the Commission is authorized to establish by regulation such standards to govern the possession and use of special nuclear material, source material, and byproduct material as the Commission may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property. Consistent with this statutory authority, the proposed amendments to § 50.82(a)(2), § 50.82(b), and § 52.110(b) will make clear that, after the facility licensed under 10 CFR part 50 or 52 is no longer a utilization or a production facility and until the termination of the 10 CFR part 50 license pursuant to § 50.82(a)(11) or § 50.82(b)(8) or the 10 CFR part 52 license pursuant to § 52.110(k), the NRC regulations applicable to utilization or production facilities will continue to apply to the holder of the 10 CFR part 50 or 10 CFR part 52 license, as applicable, unless those regulations explicitly state otherwise. These proposed amendments would enable a licensee to maintain reasonable assurance of adequate protection of the common defense and security and the public health and safety by requiring the licensee to continue to comply with those regulations applicable to utilization or production facilities, as applicable to that licensee, unless stated otherwise.

The NRC has identified that § 50.38 should not apply to a facility that is no longer a utilization or a production facility. Specifically, the AEA prohibits the issuance of a license for a utilization or a production facility to an entity that the Commission knows or has reason to believe is foreign owned, controlled, or dominated. However, the NRC regulations that implement this prohibition are unclear as to whether the prohibition also applies to the acquisition of a 10 CFR part 50 or 10 CFR part 52 license for a facility that is no longer a utilization or a production facility. Therefore, the NRC is proposing to amend § 50.38 such that its prohibition on transferring a license to an entity that the Commission knows or has reason to believe is owned, controlled, or dominated by an

alien, a foreign corporation, or a foreign government, is not applicable if the license is a 10 CFR part 50 or 10 CFR part 52 license for a facility that no longer meets the definition of a utilization or a production facility.

Section 50.80 governs the transfers of 10 CFR part 50 and 10 CFR part 52 licenses. It requires the written consent of the NRC before the transfer of a 10 CFR part 50 or a 10 CFR part 52 license. This section also requires applicants for a license transfer to provide the same identifying, technical, and financial information that an initial license applicant is required to provide under §§ 50.33 and 50.34. In particular, § 50.33 requires an application to state the citizenship of the applicant. Under § 50.38, the applicant is ineligible to apply for and obtain a license if it is a foreign entity.

Section 50.38 implements sections 103 and 104 of the AEA, which provide in part that a license for a utilization or production facility may not be issued to an alien or any corporation or other entity if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. Since sections 103 and 104 of the AEA apply to utilization and production facilities, the NRC is proposing to amend § 50.38 to clarify that this prohibition does not apply to a person, corporation, or other entity seeking a license for a facility that is no longer a utilization or a production facility, as would be provided under revised § 50.82(a)(2), § 50.82(b)(6), or § 52.110(b).

The proposed amendment to § 50.38 would maintain the common defense and security and the public health and safety because, even though § 50.38 would not prohibit the transfer to foreign entities of 10 CFR part 50 and 10 CFR part 52 licenses for facilities that do not meet the definition of utilization or production facility, other regulations ensure that such transfers would not be inimical to the common defense and security or to the public health and safety. For instance, § 50.80(c) states that the

Commission will approve an application for the transfer of a license if the Commission determines that the proposed transferee is qualified to be the holder of the license and that the transfer of the license is otherwise consistent with applicable provisions of law, regulations, and orders issued by the Commission. In turn, under § 50.57 or § 52.97, the Commission may issue a 10 CFR part 50 or 10 CFR part 52 license, respectively, only if the Commission finds that the issuance of the license will not be inimical to the common defense and security or to the public health and safety.

The proposed amendment to § 50.38 is consistent with exemptions from § 50.38 that the NRC granted in 2013 to the licensees for Maine Yankee Atomic Power Station, Haddam Neck Plant, and Yankee Nuclear Power Station (78 FR 58571; September 24, 2013). Specifically, the NRC granted those exemptions because the reactor facilities had been dismantled and removed such that only ISFSIs remained on site; an ISFSI, whether licensed under 10 CFR parts 50 or 72, is not capable of making use of special nuclear material; and the AEA definition of a utilization facility does not include ISFSIs. The NRC found that the foreign ownership, control, or domination prohibition did not apply to ISFSIs and, thus, did not preclude the NRC from granting the exemptions.

The NRC is also proposing to amend §§ 50.1, 50.51, 52.0, and 52.109 in light of the proposed amendments to §§ 50.38, 50.82, and 52.110. The proposed amendments would make clear that the regulations in 10 CFR part 50, and the similar regulations in 10 CFR part 52, provide not only for the licensing of utilization and production facilities, but also for their decommissioning and the termination of their associated licenses. These changes are clarifications; 10 CFR part 50 has included decommissioning and license termination since 1961 (“Creditors’ Rights; and Transfer, Surrender, and Termination of Licenses,” 26 FR 9546; October 10, 1961). The NRC proposes to delete the language in §§ 50.51 and 52.109 that discusses what 10 CFR parts 50 and 52

licenses authorize in lieu of the more complete discussion provided in the proposed amendments to § 50.82(a)(2), § 50.82(b)(6) and (7), and § 52.110(b).

The NRC is proposing to add a specific definition for “non-power production or utilization facility” to § 50.2 to establish a term that is flexible enough to capture all non-power facilities licensed under § 50.22, “Class 103 licensees; for commercial and industrial facilities,” and § 50.21(a) or (c), except fuel reprocessing facilities. This proposed rule would address inconsistencies in definitions and terminology associated with non-power production and utilization facilities in § 50.2 that result in challenges in determining the applicability of the regulations. Fuel reprocessing plants would be excluded from the definition because the consequences associated with the hazards at a fuel reprocessing plant would likely exceed those anticipated at the facilities within the “non-power production or utilization facility” definition, thereby affecting the applicability of the “non-power production or utilization facility” term.

The only NRC-licensed fuel reprocessing plant is the West Valley Demonstration Project (WVDP). The technical specifications of the WVDP NRC license are currently suspended by license amendment. Under the West Valley Demonstration Project Act, Pub. L. No. 96-368, 94 Stat. 1347 (codified as a note to 42 U.S.C. § 2021a), the Department of Energy (DOE) is currently decommissioning portions of the plant. The NRC licensee, the New York State Energy Research and Development Authority, will complete the decommissioning work after DOE has completed its work under the WVDP Act. There is currently no application for another fuel reprocessing plant and the NRC does not anticipate any application in the foreseeable future.

The NRC proposes to revise the introductory text of § 50.82(b) to replace the term “non-power reactor licensees” with “non-power production or utilization facility licensees and fuel reprocessing plants” to ensure that all non-power facilities licensed

under § 50.22 or § 50.21(a) or (c) are subject to the relevant termination and decommissioning regulations.

#### **N. Clarification of Scope of License Termination Plan Requirement**

The NRC is proposing to amend its regulations to clarify that the requirement for a license termination plan in § 50.82(a)(9) and § 52.110(i) applies only to power reactor licensees that commenced operation. This clarification is being proposed in response to apparent confusion among combined license holders that have sought to surrender their licenses before operation. By letter dated November 1, 2017 (ADAMS Accession No. ML17311A143), Duke Energy Florida informed the NRC that it would seek termination of the 10 CFR part 52 combined licenses for Levy Nuclear Plant Units 1 and 2 and would submit a license termination plan in accordance with § 52.110(i). Subsequently, South Carolina Electric & Gas Company (SCE&G) submitted a letter dated December 27, 2017 (ADAMS Accession No. ML17361A088), seeking withdrawal of the 10 CFR part 52 combined licenses for Virgil C. Summer Nuclear Station Units 2 and 3. The SCE&G request neither cited § 52.110 nor indicated that it would submit a license termination plan. Instead, SCE&G cited the Commission's final "Policy Statement on Deferred Plants" (52 FR 38077; October 14, 1987) (Policy Statement) to support its request for NRC approval to withdraw its combined licenses. The Policy Statement addresses holders of construction permits that defer or terminate plant construction. The Policy Statement provides that a permit holder can request to withdraw its permit and does not cite to the license termination provisions in 10 CFR part 50. The Policy Statement was issued prior to the promulgation of 10 CFR part 52 and has not been updated since, but there is nothing to prevent holders of a combined license from following the applicable

parts of the Policy Statement while continuing to comply with the Commission's regulations and the terms and conditions of the combined license.

The requirement for a license termination plan in § 52.110(i) does not apply to plants that have not begun operating. While § 52.110(i) does refer to “[a]ll power reactor licensees,” the regulatory history and context indicates that § 52.110 as a whole applies only to plants that have started operation:

- The organization of § 52.110 generally follows the license termination process for an operating plant, from permanent cessation of operations to permanent removal of fuel to decommissioning activities to license termination. The requirement for a license termination plan should be understood in this context.

- The vast majority of the requirements in § 52.110 (including § 52.110(i)) either explicitly refer to, or make sense only in the context of, a plant that has operated and is undergoing decommissioning.

- The “[a]ll power reactor licensees” language also appears in § 50.82(a)(9), the 10 CFR part 50 analogue to § 52.110(i). But the NRC does not apply the similar requirements in § 50.82 to holders of construction permits even though construction permits fall within the definition of “License” in § 50.2. For example, the following construction permit terminations do not cite or otherwise address § 50.82: “Washington Public Power Supply System, Washington Nuclear Project, Unit 3; Order Revoking Construction Permit No. CPPR-154” (64 FR 4725; January 29, 1999); “Bellefonte Nuclear Plant, Units 1 and 2—Withdrawal of Construction Permit Nos. CPPR-122 for Unit 1 and CPPR-123 for Unit 2” (September 14, 2006) (ADAMS Accession No. ML061810505); and “Energy Northwest Nuclear Project No. 1—Termination of Construction Permit CPPR-134” (February 8, 2007) (ADAMS Accession No. ML070220011). And the rule issuing the “[a]ll power reactor licensees” language in



§ 50.82(a)(9)—the 1996 Final Rule—was directed at holders of operating licenses, not construction permits.

- According to the final rule issuing § 52.110, “Licenses, Certifications, and Approvals for Nuclear Power Plants” (72 FR 49351; August 28, 2007), § 52.110 and its companion regulation § 52.109 were intended to be analogous to the requirements in § 50.51 and § 50.82 for permanent shutdown of a nuclear power plant, its decommissioning, and the termination of the operating license.

For these reasons, § 52.110 is best understood to apply only to plants that began operation. However, to avoid confusion over the license termination plan requirement, the NRC proposes to amend § 52.110(i) so that it explicitly applies only to “power reactor licensees that commenced operation.” As stated in the “Final Procedures for Conducting Hearings on Conformance With the Acceptance Criteria in Combined Licenses” (81 FR 43266; July 1, 2016), the NRC has historically understood operation as beginning with the loading of fuel into the reactor. Therefore, § 52.110(i) would apply to 10 CFR part 52 power reactor licensees that have begun to load fuel into the reactor.

A conforming change is also proposed in § 50.82(a)(9) to clarify that the requirement in that provision—that all 10 CFR part 50 power reactor licensees must submit an application for termination of license—applies to only those 10 CFR part 50 power reactor licensees that commenced operation.

## **V. Specific Requests for Comments**

The NRC is seeking ~~advice and recommendations from the~~ public comment on this proposed rule. The agency is particularly interested in comments and supporting rationale from the public on the following:

- Insurance for Specific License ISFSI: A 10 CFR part 50 or 10 CFR part 52 power reactor licensee with a 10 CFR part 72 general license ISFSI at the reactor site is subject to the financial protection requirements under 10 CFR part 140, whereas a specific license ISFSI under 10 CFR part 72 is not. In SECY-04-0176, “Exemption Requests to Reduce Liability Insurance Coverage for Decommissioning Reactors after Transfer of all Spent Fuel from a Spent Fuel Pool to Dry Cask Storage,” dated September 29, 2004 (ADAMS Accession No. ML040850518), the NRC staff noted that general license ISFSIs subject to the requirements under 10 CFR part 72 were also subject to the requirements of a 10 CFR part 50 license and by virtue of this license, they are required to maintain some level of liability insurance under section 170, “Indemnification and Limitation of Liability,” of the AEA (known as the Price-Anderson Act) and the NRC’s implementing regulations at 10 CFR part 140. Further, the NRC staff acknowledged that there was little technical difference between a general license ISFSI and a specific license ISFSI.

The NRC recognizes that as a reactor site is decommissioned, eventually all that remains of the 10 CFR part 50 or part 52 licensed site is a general license ISFSI under 10 CFR part 72, which is essentially the same as a specific license ISFSI under 10 CFR part 72. Considering that 10 CFR part 72 specific license ISFSIs have no financial protection requirements, should the NRC address the disparity between specific license and general license ISFSIs as a part of this rulemaking? Please provide an explanation for your response.

- Financial Protection Adjustments for Inflation: The reduced financial protection exemption amounts proposed in this rulemaking for Level 2 (\$100 million for offsite financial protection and \$50 million for onsite financial protection) were proposed in the 1990s and have not been adjusted for inflation. After almost 20 years,

consideration should be given to adjusting these figures for inflation. If the NRC chooses to adjust these figures for inflation, subsequent inflation adjustments would be made in 5 year increments to coincide with the Price-Anderson Act inflation adjustments required by Section 170t of the AEA.

In its SRM for SECY-93-127, "Financial Protection Required of Licensees of Large Nuclear Power plants during Decommissioning," dated July 13, 1993 (ADAMS Accession No. ML003760936), the Commission approved a policy to allow a licensee to withdraw from participation in the second insurance protection layer and reduce the amount of primary liability insurance coverage to \$100 million provided they met a certain technical criterion (i.e., the spent fuel cooling standard). Therefore, in calculating an adjustment for inflation to the offsite and onsite financial protection values of \$100 million and \$50 million, respectively, the NRC considered as its starting point July 1993 (the approval date of the \$100 million financial protection figure) and ending point to be July 2017. By adjusting for a 2.2 percent annualized rate of inflation during the 24-year and 4 month period between July 1993 and November 2017 (using the Consumer Price Index, Bureau of Labor Statistics data), the primary financial protection and onsite amounts would equate to approximately \$171 million and \$85 million, respectively, in July 2017 dollars.

As part of this rulemaking, should the NRC adjust the financial protection amounts proposed for Level 2 (\$100 million for offsite financial protection and \$50 million for onsite financial protection) for inflation and provide a mechanism to adjust these values periodically in 5-year increments to coincide with the Price-Anderson Act inflation adjustments required in Section 170t of the AEA? Please provide an explanation for your response.

- Recordkeeping Requirements for Facilities Licensed under 10 CFR Part 52:

The current appendices in 10 CFR part 52 contain section X, "Records and Reporting," for all of the certified designs codified in 10 CFR part 52. Section X requires, in part, that all departures from the certified design be recorded and those records kept throughout the term of the license. However, as part of this rulemaking, the NRC is proposing to change the record retention requirements for power reactors in the decommissioning process such that they no longer need to retain certain records associated with SSCs that are no longer in service or necessary to keep the plant in a safe condition. The NRC is considering making conforming changes to section X of the applicable appendices to 10 CFR part 52 to allow this change to apply to records of departures from the certified design as well as the associated SSCs. Given the already existing change control procedures in the appendices to 10 CFR part 52, as well as the significant changes in recordkeeping technology since the NRC's record retention requirements were introduced (i.e., digital media instead of paper copies), should additional changes be made to the 10 CFR part 52 appendices as a part of this rulemaking, and would such changes be beneficial to 10 CFR part 52 licensees or add efficiency to the decommissioning process for these facilities? Please provide an explanation for your response.

- Identical Requirements under § 50.82 and § 52.110: As part of this rulemaking, the NRC proposes to revise § 52.110 to make the same changes proposed in § 50.82 for the reasons previously discussed and for consistency. The NRC also proposes to add paragraphs (h)(5) through (h)(7) to § 52.110 with site-specific decommissioning cost estimate reporting requirements that are identical to the requirements in § 50.82(a)(8)(v) through (vii). Given that the decommissioning financial assurance requirements in § 52.110 are identical to the requirements in § 50.82, should

the NRC consider removing the specific requirements from § 52.110(f)–(h) and instead adding a reference in § 52.110 to the identical regulations in § 50.82(a)(6)–(8)? Are there any other provisions in § 52.110 that the NRC should consider removing and replacing with a reference to an identical requirement in § 50.82 (e.g., the decommissioning requirements under § 52.110(c)–(e))? Please provide an explanation for your response.

## **VI. Section-by-Section Analysis**

The following paragraphs describe the specific changes proposed by this rulemaking.

### **Appendix G to 10 CFR Part 20, Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifests.**

In section III, paragraph E.1., this proposed rule would remove the word “or” and add in its place the word “of” and it would also remove the phrase “20 days”, and add in its place the phrase “45 days”.

### **Section 26.3 Scope.**

In § 26.3, this proposed rule would revise paragraph (a) by subdividing it into two subparagraphs, (a)(1) and (2), to include the NRC’s docketing of a license holder’s certifications required under §§ 50.82 and 52.110(a).

**Section 26.825 Criminal penalties.**

In § 26.825, this proposed rule would revise paragraph (b) to remove the number “26.3” from the list of regulations in 10 CFR part 26 that are excluded from § 26.825(a).

**Section 50.1 Basis, purpose, and procedures applicable.**

In § 50.1, this proposed rule would add language clarifying that the regulations in 10 CFR part 50 provide for the licensing of production and utilization facilities through the termination of the associated 10 CFR part 50 licenses.

**Section 50.2 Definitions.**

In § 50.2, this proposed rule would retain the existing definition of *certified fuel handler* and add an alternative definition for the purposes explained elsewhere in this document. This proposed rule also would add a definition for a *non-power production or utilization facility*.

**Section 50.4 Written communications.**

In § 50.4, this proposed rule would revise paragraph (b)(9) to require a licensee to state the date of permanent cessation of operations as well as the date on which the fuel was removed from the reactor.

**Section 50.38 Ineligibility of certain applicants.**

This proposed rule would revise § 50.38 by including the current text as paragraph (a) and by adding paragraph (b) to state that the prohibition in paragraph (a)

of this section does not apply to a person, corporation, or other entity seeking a license for a facility that is not a production or utilization facility.

**Section 50.47 Emergency plans.**

This proposed rule would make conforming changes to paragraph (b) in § 50.47 and would add paragraph (f) denoting when the planning standards in paragraph (b) of this section do not apply.

**Section 50.51 Continuation of license.**

In § 50.51, this proposed rule would remove the phrase, “to authorize ownership and possession of the production or utilization facility,” for reasons discussed elsewhere in this document.

**Section 50.54 Conditions of licenses.**

In § 50.54, this proposed rule would revise footnote 2 to the table in paragraph (m)(2)(i) to indicate when a Shift Technical Advisor is not required; it would revise paragraph (p) to include the definitions for *change* and *decrease in the safeguards effectiveness* for use in paragraph (p), would revise and redesignate existing paragraphs (p)(1) and (2) as (p)(2) and (3), and would redesignate paragraphs (p)(3) and (4) as paragraphs (p)(5) and (6) and would add new paragraphs (p)(1) and (4).

This proposed rule would revise: paragraph (q)(1) to clarify that the definitions are for use in paragraph (q), paragraph (q)(1)(iii) to remove the reference to appendix E to 10 CFR part 50, paragraph (q)(2) to add clarification to the applicability, paragraph (q)(3) to add applicable emergency planning requirements, paragraphs (q)(4) and (5) to remove the phrase “after February 21, 2012,” and add new paragraphs (q)(7) and (8) to

add the requirements for licensees after the NRC docket their certifications required for decommissioning under § 50.82(a)(1) or § 52.110(a).

Paragraph (s)(2)(ii) would be revised by removing the phrase “after April 1, 1981,” and paragraph (s)(3) would be revised by adding clarification at the beginning of the sentence that if the standards apply to offsite radiological response plans then the NRC will base its findings on a review of FEMA findings and determinations.

Paragraph (t) would be revised by replacing “.” with “or” in the second sentence of paragraph (t)(1)(ii), adding new subparagraph (t)(1)(iii) to clarify the interval at which the licensee’s emergency preparedness plan must be reviewed after the NRC has docketed the certifications required for decommissioning, and by adding new paragraph (t)(3) to state that the review requirement is no longer required once all fuel is in dry cask storage.

Paragraph (w) would be revised by adding new paragraphs (w)(5) and (6) to include the financial protection requirements for production or utilization facilities undergoing decommissioning.

Paragraph (bb) would be revised by restructuring the paragraph and revising the requirements of an irradiated fuel management plan.

#### **Section 50.59 Changes, tests, and experiments.**

In § 50.59, this proposed rule would revise paragraph (d)(3) to include the exception for when the records of changes requirement in paragraph (d)(3) applies.

#### **Section 50.71 Maintenance of records, making of reports.**

In § 50.71, this proposed rule would revise paragraph (c) by including the current text as paragraph (c)(1) and it would add new paragraph (c)(2) to add records



requirements for licensees for whom the NRC has docketed the certifications required for decommissioning.

**Section 50.75 Reporting and recordkeeping for decommissioning planning.**

In § 50.75, this proposed rule would revise paragraph (a) by clarifying the availability of funds to decommission a facility as defined in § 50.2.

Paragraph (b)(1) would be revised by replacing “financial” with “reasonable” assurance and other conforming changes; paragraph (b)(3) would be revised by removing the phrase “as acceptable to the NRC” from the end of the paragraph; paragraph (b)(4) would be revised to include a site-specific decommissioning cost estimate and the second sentence of current paragraph (b)(4) would be moved to become a new paragraph (b)(5).

Paragraph (e)(1) would be revised to include the term “reasonable” financial assurance and paragraphs (e)(1)(i) and (ii) would be revised to include the description of “decommissioning cost” before the word estimate throughout each paragraph.

Paragraph (f) would be amended by revising (f)(1) to include the requirement for a report to include information regarding any potential decommissioning shortfall, it would be further amended by removing paragraph (f)(2) and redesignating (f)(3) through (5) as (f)(2) through (4) with minor revisions.

Paragraphs (h)(1)(iii) and (iv) and (h)(2) would be revised to remove the reference to three office directors within the NRC for the submission of written notice of the intention to make a payment or disbursement of funds and replace it with the Document Control Desk.

## **Section 50.82 Termination of license.**

In § 50.82, this proposed rule would revise paragraph (a)(2) to provide clarification as to when a licensed nuclear power reactor is no longer considered to be a utilization facility. It also would revise paragraph (a)(4)(i) to clarify that licensees provide the basis for whether the environmental impacts from site-specific decommissioning activities are bounded by federally issued environmental review documents. The phrase “including the projected cost of managing irradiated fuel” would be removed at the end of the last sentence. Paragraph (a)(4)(ii) would be revised to include the requirement for the NRC to include the irradiated fuel management plan in the notice of the receipt of the PSDAR in the *Federal Register* and to allow the public to comment.

Paragraph (a)(6)(ii) would be revised to provide clarification.

Paragraph (a)(8)(i)(A) would be revised to remove the words “legitimate decommissioning,” and paragraph (a)(8)(ii) would be revised to clarify paragraphs (b) and (c) to § 50.75 are where the specified amounts are located.

Paragraph (a)(8)(v) would be revised to spell out the acronym DCE, decommissioning cost estimate, and to include the ability for the licensee to combine the reporting requirements of 10 CFR part 72 and § 50.82(a)(8)(vii).

Paragraph (a)(8)(vii) would be revised to spell out the acronym DCE, decommissioning cost estimate.

Paragraph (a)(8)(viii) would be added to allow licensees to use decommissioning trust funds for spent fuel management and for specific license ISFSI decommissioning expenses provided that ~~3~~three conditions are met.

Paragraph (a)(9) would be revised to clarify that all power reactors that commenced operation must submit an application for termination of a license and

paragraph (a)(9)(ii)(F) would be revised to include the requirement to identify funding sources for license termination, spent fuel management, and ISFSI decommissioning.

The introductory text of paragraph (b) would be revised to replace the term “non-power reactor licensees” with “non-power production or utilization facilities and fuel reprocessing plants.”

Paragraph (b)(6) would be redesignated as (b)(8) and new paragraphs (b)(6) and (7) would be added to include the criteria for when a non-power production or utilization facility or fuel reprocessing plant licensed under 10 CFR part 50 is no longer considered a production or utilization facility.

#### **Section 50.109 Backfitting.**

This proposed rule would revise § 50.109 in its entirety to provide backfitting provisions for reactors both before and during decommissioning ~~and to include Commission direction from COMSECY-16-0020 that a documented evaluation required for a modification necessary to bring a facility into compliance with a license or the rules or orders of the Commission, or into conformance with the licensee's written commitments, must include a consideration of the costs of imposing the modification.~~

#### **Section 50.200 Power reactor decommissioning emergency plans.**

This proposed rule would add new § 50.200 that would contain the emergency preparedness requirements for power reactor facilities in decommissioning.

#### **Appendix A to 10 CFR Part 50, General Design Criteria for Nuclear Power Plants.**

This proposed rule would revise Criterion 1 in section I. Overall Requirements in appendix A to 10 CFR part 50 by revising the last sentence regarding the records to be

maintained by the licensee regarding SSCs until the NRC docket the certifications required for decommissioning.

**Appendix E to 10 CFR Part 50, Emergency Planning and Preparedness for Production and Utilization Facilities.**

This proposed rule would revise section I. Introduction of appendix E to 10 CFR part 50 by removing paragraph 6.

Section IV. Content of Emergency Plans of appendix E to 10 CFR part 50 would be revised by removing from paragraph 4 the phrases “of the later of the date” and “or December 23, 2011,” from the first sentence; new paragraph 8 would be added to inform licensees that the requirements of paragraphs 4, 5, and 6 of this section are no longer required once the NRC docket the licensee’s certifications required for decommissioning; paragraphs A.7., A.9., B.1., C.2., E.8.c., and I. would all be revised by removing the “by date” phrases; paragraph D.4. would be removed; the last sentence of paragraph E.8.d. would be removed; in paragraph F.2.d., the end of the 3<sup>rd</sup> sentence beginning with the word “and” would be removed; in paragraph F.2.j, the third sentence from the end would be removed; and new paragraph F.2.k would be added to require licensees to follow the biennial exercise requirements in either paragraph F.2 of appendix E to 10 CFR part 50 or § 50.200(c) after the NRC docket the certifications required for decommissioning.

This proposed rule would revise section VI. Emergency Response Data System of appendix E to 10 CFR part 50 by removing the date in paragraph 4.a. and the date in paragraph 4.d., also in paragraph 4.d. it would remove the phrase “, whichever comes later” from the first sentence.

**Section 51.53 Postconstruction environmental reports.**

This proposed rule would revise paragraph (d) to remove the first sentence and to add references to § 52.110 or a decommissioning plan under § 50.82 of this chapter.

**Section 51.95 Postconstruction environmental impact statements.**

This proposed rule would revise paragraph (d) to refer to the license termination plan under § 50.82 or § 52.110 or a decommissioning plan under § 50.82.

**Section 52.0 Scope.**

In § 52.0, this proposed rule would add language clarifying that the regulations in 10 CFR part 52 remain effective through the termination of the associated 10 CFR part 52 licenses.

**Section 52.3 Written communications.**

This proposed rule would revise paragraph (b)(9) to require a licensee to state the date of permanent cessation of operations and the date on which the fuel was removed from the reactor.

**Section 52.63 Finality of standard design certifications.**

This proposed rule would revise paragraph (b)(2) by removing the last sentence and by adding new paragraphs (b)(2)(i) and (ii) regarding the recordkeeping and retention requirements for departures from the design of a facility.

**Section 52.109 Continuation of combined license.**

In § 52.109, this proposed rule would remove the phrase, “to authorize ownership and possession of the production or utilization facility,” for reasons discussed elsewhere in this document.

### **Section 52.110 Termination of license.**

This proposed rule would revise paragraph (b) as paragraph (b)(1) and would add paragraph (b)(2) to provide clarification as to when a facility licensed under 10 CFR part 52 is no longer considered to be a production or utilization facility. Paragraph (d)(1) would be revised to clarify that licensees provide the basis for whether the environmental impacts from site-specific decommissioning activities are bounded by federally issued environmental review documents, and the phrase “site-specific decommissioning cost estimate” would be added at the end of the last sentence. Paragraph (d)(2) would be revised to include the requirement for the NRC to include the irradiated fuel management plan in the notice of the receipt of the PSDAR in the *Federal Register* and to allow the public to comment.

Paragraph (f)(2) would be revised to clarify the decommissioning activities ~~a~~ licensees shall not perform. Paragraph (h)(1)(i) would be revised to remove the phrase “legitimate decommissioning,” paragraph (h)(2) would be revised to include a more specific regulatory reference, and paragraphs (h)(5) through (8) would be added with requirements for the submission of financial status reports and use of § 50.75 decommissioning trust funds for spent fuel management and 10 CFR part 72 specific license ISFSI decommissioning expenses. Paragraph (i) would be revised to clarify that all power reactor licensees that commenced operation must submit an application for termination of a license. Paragraph (i)(2)(vi) would be revised to include identification of

sources of funds for license termination, spent fuel management, and ISFSI decommissioning, as applicable.

**Section 72.13 Applicability.**

This proposed rule would revise § 72.13 by adding a new paragraph (e) to incorporate conforming changes to match technical changes elsewhere in the rule.

**Section 72.30 Financial assurance and recordkeeping for decommissioning.**

This proposed rule would revise § 72.30 by removing the second sentence in paragraph (c). The proposed revisions would create new paragraphs (b)(1)–(3) and redesignate the existing paragraphs (b)(1)–(6) as new (b)(3)(i)–(vi).

**Section 72.32 Emergency Plan.**

In § 72.32, this proposed rule would clarify that the requirement for having an emergency plan applies when the proposed ISFSI would not be located on the site or within the exclusion area of a nuclear power reactor licensed under 10 CFR parts 50 or 52. The proposed revisions would consolidate the current language and remove redundancies by using standardized language consistent with other proposed rule provisions.

**Section 72.72 Material balance, inventory, and records requirements for stored materials.**

This proposed rule would revise paragraph (d) by breaking it into three paragraphs. The last sentence of the current paragraph (d) would become paragraph

(d)(3). New text is proposed for paragraph (d)(2) and minor revisions are proposed for paragraph (d)(1).

**Section 72.212 Conditions of general license issued under § 72.210.**

This proposed rule would revise § 72.212 by adding new paragraphs (b)(9)(vii)(A) and (B) regarding the protection of spent fuel after the NRC docket the decommissioning certifications. Paragraph (b)(9)(vii)(A) would allow a licensee to voluntarily provide for physical protection of the spent fuel under Subpart H of this part and § 73.51 of this chapter. Paragraph (b)(9)(vii)(B) would require a licensee who elects to provide physical protection under Subpart H of this part and § 73.51 of this chapter to notify the NRC of this decision using the provisions of § 50.54(p)(2).

**Section 72.218 Termination of license.**

This proposed rule would revise § 72.218 by revising paragraphs (a) and (b) and removing paragraph (c). Paragraph (a) is revised to reference the decommissioning requirements in § 50.82 or § 52.110 that apply to the general license and paragraph (b) is revised to state when the general license is considered terminated.

**Section 73.51 Requirements for the physical protection of stored spent nuclear fuel and high-level radioactive waste.**

This proposed rule would revise § 73.51 by removing text from paragraph (a), (a)(1), (a)(2), and adding new paragraph (a)(3). Paragraph (a)(3) would be added to require notification to the NRC under the provisions of § 72.212(b)(9)(vii) of this chapter by a licensee who elects to provide physical protection under Subpart H of 10 CFR part 72.



**Section 73.54 Protection of digital computer and communications systems and networks.**

This proposed rule would revise § 73.54 by removing the introductory text of the section and revising the introductory text of paragraphs (a), (b), and (c), and adding new paragraphs (i), and (j). The introductory text of paragraph (a) would be revised to capture that the rule applies during operation and decommissioning. Minor edits would be made to paragraphs (b) and (c). Paragraph (i) states that the requirements of § 73.54 no longer apply once the criteria in (i)(1) and (2) are met. Paragraph (j) provides for the removal of the cyber security license condition.

**Section 73.55 Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage.**

This proposed rule would revise § 73.55 by clarifying in paragraph (b)(3) that a licensee's physical protection program must be designed to prevent significant core damage until the NRC docket the certifications required for decommissioning.

New paragraphs (b)(9)(ii)(B)(1), (2), (2)(i), and (2)(ii) would be added to provide additional clarification for licensees implementing fitness for duty programs.

Paragraph (c)(6) would be revised by replacing the text beginning with the words "that describes" through the end of the sentence with the phrase, "in accordance with the requirements of § 73.54 of this part."

Paragraph (e)(9)(v)(A) would be revised to provide clarification for when the reactor control room would not be considered a vital area.

Paragraph (j)(4)(ii) would be revised to include a system for communication with certified fuel handlers if the NRC had docketed the certifications required for decommissioning.

Paragraph (p)(1)(i) and (ii) would be revised to allow a certified fuel handler or a licensed senior operator to approve the suspension of security measures if the NRC has docketed the certifications required for decommissioning.

**Section 140.11 Amounts of financial protection required for certain reactors.**

This proposed rule would revise § 140.11 by adding new paragraphs (a)(5), (a)(5)(i) and (ii) and by redesignating paragraph (b) as paragraph (c) and adding new paragraph (b) that would provide the requirements for the amounts of financial protection required for reactors in decommissioning.

**Section 140.81 Scope and purpose.**

This proposed rule would revise § 140.81 by clarifying the scope of who is subject to the requirements in this section and to further clarify that this section no longer applies once a licensee meets the requirements of § 140.11(a)(5)(i) and (ii).

**VII. Regulatory Flexibility Certification**

As required by the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this rule, if adopted, will not have a significant economic impact on a substantial number of small entities. This proposed rule affects only the licensing and operation of nuclear power plants. The companies that own these plants do not fall within the scope of the definition of “small entities” set forth in the Regulatory Flexibility Act or the size standards established by the NRC (§ 2.810).

## **VIII. Regulatory Analysis**

The NRC has prepared a draft regulatory analysis for this proposed rule. The analysis examines the costs and benefits of the alternatives considered by the NRC. The NRC requests public comment on the draft regulatory analysis. The draft regulatory analysis is available as indicated in the “*Availability of Documents*” section of this document. Comments on the draft analysis may be submitted to the NRC as indicated under the ADDRESSES section of this document.

## **IX. Backfitting and Issue Finality**

The NRC’s backfitting provisions for holders of construction permits and operating licenses appear in § 50.109, “Backfitting” (the Backfit Rule). Issue finality provisions (analogous to the backfitting provisions in § 50.109) for applicants and holders of combined licenses are located in § 52.83, “Finality of referenced NRC approvals; partial initial decision on site suitability,” and § 52.98, “Finality of combined licenses; information requests.” This section describes the backfitting and issue finality implications of the draft guidance documents described in section XVI, “*Availability of Guidance*,” in this document and this proposed rule as applied to applicants and holders of pertinent NRC approvals.

### **A. Current and Future Applicants**

Applicants and potential applicants (for licenses, permits, and regulatory approvals such as design certifications) are not, with certain exceptions, the subject of either the Backfit Rule or any issue finality provisions under 10 CFR part 52. Neither the Backfit Rule nor the issue finality provisions under 10 CFR part 52—with certain

exclusions discussed below—were intended to apply to every NRC action that substantially changes the expectations of current and future applicants, and applicants have no reasonable expectation that future requirements will not change (“Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants; Final Rule,” 54 FR 15372, at 15385-15386; April 18, 1989).

The exceptions to this general principle are applicable whenever a combined license applicant references a 10 CFR part 52 license (e.g., an early site permit) or NRC regulatory approval (e.g., a design certification rule) with specified issue finality provisions. The issues that are resolved in an early site permit or a design certification and accorded issue finality do not include decommissioning matters that are the subject of this proposed rule and draft guidance, and the proposed rule and draft guidance do not contain design requirements. Therefore, the proposed rule and draft guidance would not be inconsistent with the issue finality provisions applicable to early site permits and design certifications. For the same reasons, the issue finality provision applicable to combined license applicants (§ 52.83) would not apply to a combined license applicant referencing either an early site permit or a design certification with respect to compliance with this rule.

## **B. Existing Design Certifications**

The issues that are resolved in a design certification and accorded issue finality do not include decommissioning matters that are the subject of this proposed rule and draft guidance. Because the decommissioning matters that are the subject of this proposed rule and draft guidance are limited to power reactor decommissioning, they would not be applied to existing or future design certifications.

### **C. Existing Licensees**

Most of the power reactor licensees transitioning to decommissioning have historically requested exemptions from the same requirements. These requirements are typically in the areas of emergency preparedness, physical security, decommissioning funding, record retention, low-level waste transportation, and offsite and onsite financial protection and indemnity agreements. In approving these exemption requests, the NRC has imposed almost identical regulatory frameworks on each decommissioning licensee. To the extent that this proposed rule would make generically applicable a set of requirements similar to the regulatory relief provided to these individual licensees through these exemptions, the proposed rule, as applied to these licensees, would not constitute backfitting under § 50.109.

In addition to amendments that reflect the regulatory relief provided by exemptions, the proposed rule includes certain regulations that would provide an alternative set of requirements for any power reactor licensee during decommissioning. Because these optional requirements would not be imposed upon licensees and would not prohibit licensees from following existing requirements, the proposed requirements would not constitute backfitting or a violation of issue finality.

Several proposed amendments involve recordkeeping and reporting requirements, which do not fall within the purview of the Backfit Rule and issue finality regulations. See, e.g. "Reporting Requirements for Nuclear Power Reactors and Independent Spent Fuel Storage Installations at Power Reactor Sites; Final Rule," 65 FR 63769, October 25, 2000. The remaining proposed changes would not meet the definition of "backfitting" in 10 CFR 50.109 or constitute violations of issue finality because they would be edits to existing regulations without a direct link to radiological

public health and safety or common defense and security, such as the process to change a licensee's security plan; edits to existing requirements for the NRC; or edits to existing regulations to clarify the language of the regulations without imposing new or different requirements.

One aspect of this proposed rule would constitute a violation of issue finality for existing licensees; that issue is described in the next section.

#### **D. Backfit Analysis**

##### **1. Introduction and Background**

As part of this proposed rule, the NRC is proposing a modification to the cyber security requirements in § 73.54. This proposed rule would ensure that these requirements continue to apply to power reactor licensees that have submitted their § 50.82(a)(1) or § 52.110(a) certifications until such time that all spent fuel in the SFP has sufficiently decayed (i.e., at least 10 months for BWRs and 16 months for PWRs after the date of permanent cessation of operations, or an NRC-approved alternative spent fuel decay period).

This amendment would likely constitute a violation of issue finality for 10 CFR part 52 COL holders, as defined in § 52.98. These licensees are not currently required to maintain their cyber security programs past the date that they are no longer authorized to operate the reactor. If the proposal to require these licensees to maintain their cyber security program into the decommissioning phase would extend the duration that a COL holder would be required to maintain a cyber security program, then that extension would constitute a new or changed requirement for that licensee and, thus, violate that COL's issue finality.

## 2. Detailed Description of the Proposed Violation of Issue Finality

The NRC sets forth the current cyber security requirements for power reactors in § 73.54. The NRC established these requirements as part of the 2009 final rule, “Power Reactor Security Requirements” (74 FR 13926, March 27, 2009) (2009 Final Rule). The preamble to § 73.54 states, in part, that by November 23, 2009, each nuclear power reactor licensee “currently licensed to operate” must submit to the NRC a cyber security plan (CSP) for review and approval. The preamble further states that the requirements in § 73.54 are applicable to current “applicants for an operating license or combined license” and mandates such applicants to amend their applications to include a CSP. In addition, every 10 CFR part 50 license for a nuclear power reactor that was operating in 2009 contains a license condition to have and maintain a Commission-approved CSP. These license conditions were issued when the NRC approved each licensee’s CSP that was submitted to the NRC as required by the 2009 Final Rule. The Tennessee Valley Authority’s 10 CFR part 50 operating license for Watts Bar Nuclear Plant, Unit 2, issued in 2015, also contains a license condition to have and maintain a CSP.

As an initial step in the decommissioning process, a nuclear power reactor licensee must submit written certifications that it has decided to permanently cease operations and has permanently removed all fuel from its reactor vessel, in accordance with § 50.82(a)(1)(i) and (ii) for power reactor licensees under 10 CFR part 50, or § 52.110(a)(1) and (2) for 10 CFR part 52 combined license holders. As stated in § 50.82(a)(2) and § 52.110(b), upon the NRC’s docketing of these certifications, the license no longer authorizes operation of the reactor or the placement or retention of fuel in the reactor vessel. In a December 5, 2016 memorandum to the Commission,<sup>7</sup> the

---

<sup>7</sup> Memorandum, “Cyber Security Requirements for Decommissioning Nuclear Power Plants,” dated December 5, 2016 (ADAMS Accession No. ML16172A284).

NRC staff explained that § 73.54 no longer applies to power reactor licensees once they have submitted, and the NRC has docketed, these certifications.

As discussed in the “*Technical Basis for Graded Approach*” section of this document, the NRC has concluded that after 10 months for BWRs and 16 months for PWRs, the spent fuel in the SFP will have decayed and cooled sufficiently such that the fuel cannot heat up to clad ignition temperature within 10 hours under adiabatic conditions. The NRC has determined that until the fuel has decayed and cooled sufficiently, power reactor licensees must maintain reasonable assurance that their critical digital assets remain protected against cyber attacks. As such, this proposed rule would modify the cyber security requirements in § 73.54 to ensure that they continue to apply to licensees of decommissioning power reactors until the spent fuel has decayed and cooled sufficiently (either through the application of a 10 month (BWR) or 16 month (PWR) decay period or an NRC-approved site-specific decay period). This proposed rule would also remove the CSP license condition from the 10 CFR part 50 licenses at the applicable 10 or 16 month interval.

This proposed rule would not constitute backfitting for currently operating or recently shutdown 10 CFR part 50 reactor licensees. Their CSP license condition remains in effect until the termination of the license or the NRC removes the condition from the license (e.g., if the licensee submits a license amendment request and the NRC approves it). The NRC has determined that the requirements of the CSP license conditions are not necessary after the spent fuel in the SFP has sufficiently cooled. The proposed rule would codify, during Level 1 of decommissioning, the already-imposed requirements of the CSP license conditions. These requirements would continue to provide adequate protection of the public health and safety and common defense and security and continue to support the effective operation of licensees’ security and



emergency preparedness programs during the time when a draindown scenario can credibly lead to a zirconium fire. (See sections 3 and 4 of this backfit analysis for additional cost/benefit discussion.) Therefore, this proposed rule would not impact these licensees' overall requirement to maintain a cyber security program, but would instead enable the automatic removal of cyber security requirements once fuel in the SFP has sufficiently cooled. Thus, the decommissioning rulemaking would not impose a new or changed requirement as the licensees are already implementing the requirement as part of their cyber security program license conditions.

Conversely, this rulemaking would constitute a violation of issue finality for 10 CFR part 52 COL holders. Each currently approved COL includes a license condition to provide the NRC with the licensee's Operational Program Implementation Schedule. The operational programs (which include development and implementation of a security program, including a cyber security program) are requirements in the regulations and not separately identified as license conditions. As a result, a COL does not require the licensee to maintain the cyber security program throughout the duration of its license. COL holders are currently required to maintain a program only as long as § 73.54 is applicable to them. Because § 73.54 no longer applies to the licensee once it is not authorized to operate a nuclear power reactor, and a power reactor licensee is not authorized to operate a nuclear power reactor during decommissioning, COL holders are not required to maintain their CSP during decommissioning. This proposed rule, which would require licensees to maintain their cyber security program for 10 months (BWR) or 16 months (PWR) beyond the date of permanent cessation of operations (or for an NRC-approved alternative spent fuel decay period) could extend the duration over which a COL holder would be required to maintain a cyber security program. That extension would constitute a new or changed requirement for that licensee.

Under § 52.98, the Commission cannot modify any term or condition of an issued combined license except in accordance with the provisions of § 52.103 or § 50.109, as applicable. This proposed rule's amendment of the cyber security requirements would violate the issue finality of the COLs issued at the time of the final rule's effective date. The provisions of § 52.103 do not apply to this proposed rule, so the NRC must show that the amendment would meet the requirements of § 50.109 to justify proceeding with this amendment. Because none of the exceptions to the requirement to prepare a backfit analysis in § 50.109(a)(4) applies to this rulemaking, § 50.109(a)(3) requires the NRC to prepare a backfit analysis that demonstrates that the proposed amendment would result in a substantial increase in the overall protection of the public health and safety or the common defense and security, and that the direct and indirect costs of implementation are justified in view of this increased protection.

### 3. Benefits: Substantial Increase in Public Health and Safety and Common Defense and Security

The NRC identified qualitative (non-quantifiable) benefits that would occur if the proposed violation of issue finality were implemented.

The NRC identified two qualitative benefits to the common defense and security and public health and safety that would be realized if the proposed rule is implemented. Specifically, the NRC finds that extending the duration over which the licensee must maintain cyber security requirements would:

- Constitute a substantial increase in protection to common defense and security by ensuring that a compromise of digital systems cannot adversely impact the effective operation of licensees' physical security programs; and

- Constitute a substantial increase in public health and safety by ensuring that a compromise of digital systems cannot adversely impact the effective operation of emergency preparedness systems in the event of a zirconium fire scenario.

### **Effective Operation of Physical Security Program**

The NRC has previously determined that attacks on the SFP are credible and have the potential to lead to an unacceptable impact to common defense and security.<sup>8</sup> Specifically, a physical attack by either an external force or malicious insiders could directly lead to a draindown scenario and subsequent zirconium fire.

As established in § 73.54, cyber security is an essential element of a licensee's physical security program that enables the licensee to effectively protect its site against the design basis threat of radiological sabotage defined in § 73.1, in accordance with § 73.55(b). Specifically, a physical attack that is augmented with a coincident cyber attack would, in many cases, have a higher chance of success over a purely physical attack.<sup>9</sup> Thus, although there is no cyber attack that can directly lead to a draindown scenario, a cyber attack can be combined with a physical attack on the SFP to improve the physical attack's likelihood of success.

Given a facility without adequate cyber security controls in place, several mechanisms exist that could improve the effectiveness of a physical attack on the SFP.

~~For example, a cyber attack could aid a physical assault on the SFP by an external attacker by:~~

---

<sup>8</sup> NUREG/BR-0314, Rev. 4, "Protecting Our Nation" dated August 2015 (ADAMS Accession No. ML15232A263).

<sup>9</sup> "Risk assessment for physical and cyber attacks on critical infrastructures," Military Communications Conference, 2005. MILCOM 2005. Institute of Electrical and Electronics Engineers. October 2005.

- ~~• disabling perimeter detection to delay or prevent onsite response to the physical assault prior to the attacker gaining entry to the SFP~~
- ~~• disrupting onsite and offsite security-related communication to reduce the effectiveness of the licensee's response to the physical assault~~
- ~~• disabling access control doors and gates to enable the attacker expedited physical access to the SFP~~

In addition, inadequate cyber security controls on facilities' access control systems could enable an attacker to inject information into a licensee's access control system in a manner that would allow unauthorized individuals to obtain unescorted access into the protected or vital areas of the facility.<sup>40</sup> This could allow one or more attackers direct access to the SFP, which could then be exploited to sabotage the SFP in a manner that would result in a draindown scenario.

This factor, combined with the severity of the consequences of a draindown scenario and subsequent zirconium fire that could result from a successful physical attack, demonstrates that maintaining cyber security requirements during the period when a draindown scenario could reasonably result in a zirconium fire (i.e., prior to the fuel in the SFP sufficiently cooling) represents a substantial increase in security.

### **Effective Operation of Emergency Preparedness Systems**

As discussed in the "*Technical Basis for the Graded Approach*" and "*Emergency Preparedness*" sections of this document, although the spectrum of credible accidents and operational events requiring an emergency response is reduced at a decommissioning power reactor as compared to that for an operating power reactor,

---

<sup>40</sup> ~~"SFAQ 17-04 Access Authorization / Access Authorization Systems," dated January 2018. Not publicly available.~~

reliable emergency preparedness functions are still required to ensure public health and safety in the event of a zirconium fire scenario.

As established in § 73.54, cyber security is an essential element of a licensee's physical security program that, in part, ensures that a compromise of digital systems cannot adversely impact emergency preparedness functions. For example, in the event of a zirconium fire scenario, the licensee's cyber security program prevents a cyber attack from adversely impacting the ability to<sup>11</sup>:

- Notify state, local, and Federal personnel of the emergency
- Request and communicate with offsite support
- Assess and classify the emergency conditions
- Disseminate information to the public during an emergency
- Conduct a radiological accident assessment

The NRC has determined that this factor demonstrates that maintaining cyber security requirements to ensure that a compromise of digital systems cannot adversely impact the operation of emergency preparedness functions until the time in which a SFP draindown would likely be mitigated prior to a zirconium fire scenario (i.e., once the fuel in the SFP has sufficiently cooled) represents a substantial increase in public health and safety.

#### 4. Costs

The NRC identified quantitative costs (i.e., costs that are amenable to quantitative evaluation) that would be incurred if the proposed violation of issue finality were implemented.

---

<sup>11</sup> NEI 10-04, Rev. 2, "Identifying Systems and Assets Subject to the Cyber Security Rule," issued July 2012 (ADAMS Accession No. ML12180A081).

Based on a review of feedback received during recent inspections of the full implementation of licensees' cyber security programs, the NRC estimates that the cost to implement a cyber security program for a decommissioning power reactor is approximately \$300,000 per site per year. As previously stated, this proposed violation of issue finality would extend the duration that a licensee must maintain its cyber security program for 10 (BWR) or 16 (PWR) months. Thus, the cost associated with this extension is approximately \$250,000 (BWR) or \$400,000 (PWR).

COLs have been issued at a total of 3 sites that utilize BWR units, and 4 sites that utilize PWR units. Assuming that all units are constructed and the per-site costs from the previous paragraph, the total cost associated with this proposed violation of issue finality if all reactors entered decommissioning today would be approximately \$2.35 million. If it is assumed that all sites with units licensed under 10 CFR part 52 decommission their reactors 40 years after the effective date of the final rule, with a discount rate of 7%, then the total, combined cost for all affected licensees associated with this proposed violation of issue finality would be approximately \$157,000. Due to the potential that some of these facilities may not be constructed or that some licensees may have voluntarily chosen to maintain their cyber security programs during this timeframe, this estimate is expected to be an upper bound.

#### 5. Determination of Substantial Benefits Justifying Costs of the Proposed Violation of Issue Finality

The NRC finds that the proposed violation of issue finality would provide a substantial increase in protection to public health and safety and common defense and security for current 10 CFR part 52 COL holders by ensuring that a compromise of digital systems cannot adversely impact the effective operation of licensees' security and

emergency preparedness programs during the time when a draindown scenario can credibly lead to a zirconium fire. The NRC finds that this substantial increase would justify the \$157,000 in costs that would accrue to the licensees.

#### 6. Conclusion

On the basis of this analysis, the NRC determines that the violation of issue finality resulting from the cyber security portion of this proposed rule would be justified under § 50.109(a)(3).

#### 7. Evaluation of Factors in § 50.109(c)(1) through (9)

In performing this analysis, the NRC considered the nine factors in § 50.109(c), as follows:

#### **Statement of the specific objectives that the backfit is designed to achieve;**

The two objectives for the cyber security portion of the “Regulatory Improvements for Production and Utilization Facilities Transitioning to Decommissioning” rulemaking are:

- To ensure the effectiveness of the physical protection program during the period over which a SFP draindown could realistically result in a zirconium fire scenario; and
- To ensure the effectiveness of emergency preparedness functions during the period over which a SFP draindown may not be mitigatable prior to the draindown resulting in a zirconium fire

Note that the violation of issue finality is only applicable to power reactors licensed under 10 CFR part 52 as of the effective date of the final rule.

**General description of the activity that will be required by the licensee or applicant in order to complete the backfit;**

The NRC is proposing a modification to the cyber security requirements in § 73.54 to ensure that these requirements continue to apply to licensees of decommissioning power reactors until such time that all spent fuel in the SFP has sufficiently decayed (i.e., 10 months for BWRs and 16 months for PWRs since the date of permanent cessation of operations, or an NRC-approved alternative spent fuel decay period). The violation of issue finality is only applicable to power reactors currently licensed under 10 CFR part 52 as of the effective date of the final rule.

**Potential change in the risk to the public from the accidental off-site release of radioactive material;**

The rulemaking is intended to reduce risk of offsite releases as a result of breaches in security at nuclear power plants, and to ensure the functionality of emergency preparedness functions in the case of a zirconium fire scenario. However, the reduction in risk to the public from offsite releases of radioactive materials has not been fully quantified because there is insufficient information and modeling to support such quantification.

**Potential impact on radiological exposure of facility employees;**

The rulemaking would provide added assurance that nuclear industry workers are not subjected to unnecessary radiological exposures as the result of a breach in security that causes a zirconium fire leading to a release of radiation that security personnel are exposed to as the result of their response activities. Further, the



rulemaking would ensure that emergency preparedness functions, including evacuation procedures, are not adversely impacted by a cyber attack during the period when a draindown scenario could reasonably result in a zirconium fire, thus ensuring that nuclear industry workers are not subjected to unnecessary radiological exposures in the case of a zirconium fire scenario.

**Installation and continuing costs associated with the backfit, including the cost of facility downtime or the cost of construction delay;**

The backfit analysis to support the violation of issue finality resulting from this proposed rule includes the NRC's estimate of the total costs for maintaining a licensee's cyber security program until the fuel in the SFP has sufficiently cooled to adequately ensure that a SFP draindown does not result in a zirconium fire scenario. The estimated one-time industry net cost associated with the violation of issue finality would be approximately \$157,000.

**The potential safety impact of changes in plant or operational complexity, including the relationship to final and existing regulatory requirements;**

The cyber security portion of this proposed rule would not impose any requirements beyond those in place while the power reactor is operational. As such, this rule is not expected to have an effect on facility complexity.

**The estimated resource burden on the NRC associated with the backfit and the availability of such resources;**

The rulemaking may result in a minor increase in the expenditure of agency resources, due to the potential for cyber security inspections to be conducted after the

licensee has ceased operations and before fuel in the SFP has sufficiently cooled.

**The potential impact of differences in facility type, design or age on the relevancy and practicality of the backfit;**

The specific cost of this rulemaking to a facility does vary, depending on whether the facility utilizes BWR or PWR reactors. This is due to time required for fuel in the SFP to sufficiently cool for each type of reactor. Further, since the violation of issue finality is only applicable to reactors licensed under 10 CFR part 52, the specific cost also depends on the percentage of reactors licensed under 10 CFR part 52 at the licensee's facility.

**Whether the backfit is interim or final and, if interim, the justification for imposing the backfit on an interim basis.**

The violation of issue finality would be final.

**E. Draft Regulatory Guidance**

As described in section XVI, "*Availability of Guidance*," in this document, the NRC is issuing four draft regulatory guides (DGs) that, if finalized, would provide guidance on the methods acceptable to the NRC for complying with aspects of this proposed rule. The DGs would apply to all current holders of operating licenses under 10 CFR part 50 and COLs under 10 CFR part 52. Issuance of the DGs in final form would not constitute backfitting under § 50.109 and would not otherwise violate issue finality under 10 CFR part 52. As discussed in the "Implementation" section of each DG, the NRC has no current intention to impose the DGs on current holders of an operating license or COL.

For the same reasons provided under “*Current and Future Applicants*” that explain why the proposed rule does not constitute backfitting or a violation of issue finality for applicants, applying the DGs to applications for operating licenses or COLs would not constitute backfitting as defined in § 50.109 and would not otherwise violate issue finality under 10 CFR part 52

## **X. Cumulative Effects of Regulation**

The NRC is following its Cumulative Effects of Regulation (CER) process by engaging extensively with external stakeholders throughout this rulemaking and related regulatory activities. Public involvement has included: (1) the publication of an ANPR for public comment (80 FR 72358) on November 19, 2015, to inform the NRC’s efforts in drafting a proposed rule regulatory basis to address issues associated with power reactor decommissioning; (2) holding a public meeting on December 9, 2015, to afford external stakeholders an opportunity to ask the NRC staff clarifying questions regarding the ANPR; (3) the publication of the draft regulatory basis for public comment (82 FR 13778) on March 15, 2017; (4) the publication of a preliminary draft of the regulatory analysis for public comment (82 FR 21481) on May 9, 2017; and (5) holding a public meeting on May 8–10, 2017, to facilitate public comments on the development of the final regulatory basis and regulatory analysis.

Another opportunity for comment is being provided to the public with this proposed rule. The NRC will be issuing the draft implementing guidance with this proposed rule to support more informed external stakeholder feedback. Further, the NRC will continue to hold public meetings throughout the rulemaking process. Section XVI, “*Availability of Guidance*,” of this document describes how the public can

access the draft implementing guidance for which the NRC seeks external stakeholder feedback.

Finally, the NRC is requesting CER feedback on the following questions:

1. In light of any current or projected CER challenges, does the proposed rule's effective date provide sufficient time to implement the new proposed requirements, including changes to programs, procedures, and facilities?
2. If CER challenges currently exist or are expected, what should be done to address them? For example, if more time is required for implementation of the new requirements, what period of time is sufficient?
3. Do other (NRC or other agency) regulatory actions (e.g., orders, generic communications, license amendment requests, inspection findings of a generic nature) influence the implementation of the proposed rule's requirements?
4. Are there unintended consequences? Does the proposed rule create conditions that would be contrary to the proposed rule's purpose and objectives? If so, what are the unintended consequences, and how should they be addressed?
5. Please comment on the NRC's cost and benefit estimates in the draft regulatory analysis that supports the proposed rule. The draft regulatory analysis is available as indicated in the "*Availability of Documents*" section of this document.

## **XI. Plain Writing**

The Plain Writing Act of 2010 (Pub. L. 111-274) requires Federal agencies to write documents in a clear, concise, and well-organized manner. The NRC has written this document to be consistent with the Plain Writing Act as well as the Presidential Memorandum, "Plain Language in Government Writing," published June 10, 1998 (63

FR 31883). The NRC requests comment on this document with respect to the clarity and effectiveness of the language used.

## **XII. National Environmental Policy Act**

This proposed rule includes some actions that are of the types described in § 51.22(c). The NRC has previously determined that these types of actions do not have a significant impact on the environment and has categorically excluded them from the requirement to prepare an environmental analysis. Specifically, the NRC has determined that some amendments in this proposed rule are the types of actions described in the § 51.22(c) exclusions noted in Table 4. Accordingly, the NRC has not developed an environmental impact statement or an environmental assessment for these portions of the proposed rule.

**Table 4—Application of 10 CFR 51.22 Categorical Exclusions to the Proposed Requirements**

<b>Regulation</b>	<b>Applicable 10 CFR 51.22 paragraph</b>
10 CFR part 26	(c)(1), (c)(3)
10 CFR 50.2	(c)(2), (c)(3)
10 CFR 50.54(bb)	(c)(3)
10 CFR 50.59(d)	(c)(3)
10 CFR 50.71(c)	(c)(3)
10 CFR 50.75(f)	(c)(3)
Elimination of 10 CFR 50.75(f)(2)	(c)(2)
10 CFR 50.82(a)	(c)(2), (c)(3)
10 CFR 50.109	(c)(2)
10 CFR part 50, appendix A	(c)(3)
10 CFR part 20, appendix G	(c)(3)
10 CFR 51.53	(c)(3)
10 CFR 51.95	(c)(3)
10 CFR 52.63	(c)(3)

10 CFR 52.110	(c)(2)
10 CFR 72.72	(c)(3)
10 CFR 72.218	(c)(3)
10 CFR part 140	(c)(1)

### **Draft Finding of No Significant Impacts**

The NRC has prepared a draft environmental assessment (EA) for the portions of this proposed rule not categorically excluded under 10 CFR § 51.22. The draft EA is available in ADAMS at Accession No. ML18023B561. The NRC prepared the draft EA to determine environmental impacts of the proposed action: a rulemaking to update the NRC's regulations related to production and utilization facilities transitioning to decommissioning. Based on the draft EA, the NRC concludes that this proposed rule would not have significant environmental impacts because the changes would be administrative or procedural in nature and would have no nexus to the physical environment or would have not significant impact on the environment. Therefore, this proposed rule does not warrant preparation of an environmental impact statement. Accordingly, the NRC has determined that a finding of no significant impact (FONSI) is appropriate.

### **XIII. Paperwork Reduction Act**

This proposed rule contains new or amended collections of information subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501-21). This proposed rule has been submitted to the Office of Management and Budget for review and approval of the information collections.

*Type of submission, new or revision:* Revision.

*The title of the information collection:* Regulatory Improvements for Production and Utilization Facilities Transitioning to Decommissioning, Proposed Rule.

*The form number if applicable:* Not applicable.

*How often the collection is required or requested:* Annually.

*Who will be required or asked to respond:* Production and utilization facility licensees.

*An estimate of the number of annual responses:* 104.

*The estimated number of annual respondents:* 23.

*An estimate of the total number of hours needed annually to comply with the information collection requirement or request:* -3,820.

*Abstract:* The proposed rule would result in changes in recordkeeping and reporting burden relative to existing rules by creating a regulatory framework for production and utilization facility licensees transitioning to decommissioning and amending existing regulations that relate to the decommissioning of production and utilization facilities. Decommissioning power reactor licensees and the NRC have expended substantial resources processing licensing actions for power reactors during their transition period to decommissioning status. Licensees that are currently

transitioning to decommissioning have been requesting NRC review and approval of licensing actions, informed by the low risk of an offsite radiological release posed by a decommissioning reactor. Specifically, the licensees are seeking NRC approval of exemptions and license amendments to revise requirements to reflect the reduced operations and risks posed by a permanently shutdown and defueled reactor. The proposed rule would, on balance, reduce the paperwork burden imposed on production and utilization facility licensees transitioning to decommissioning by establishing a graded approach to the requirements imposed on these facilities. A graded approach would adjust the level of analysis, documentation, and actions necessary to comply with safety requirements and criteria commensurate with several factors, including magnitude of any credible hazard involved, and the balance between radiological and non-radiological hazards as applicable to the level within the decommissioning process. The NRC expects that these proposed changes would enhance the efficiency of the decommissioning process, and reduce the overall burden on licensees.

The NRC is seeking public comment on the potential impact of the information collections contained in this proposed rule and on the following issues:

1. Is the proposed information collection necessary for the proper performance of the functions of the NRC, including whether the information will have practical utility?
2. Is the estimate of the burden of the proposed information collection accurate?
3. Is there a way to enhance the quality, utility, and clarity of the information to be collected?



4. How can the burden of the proposed information collection on respondents be minimized, including the use of automated collection techniques or other forms of information technology?

A copy of the OMB clearance package and proposed rule is available in ADAMS under Accession No. ML18039A192 or may be viewed free of charge at the NRC's PDR, One White Flint North, 11555 Rockville Pike, Room O-1 F21, Rockville, MD 20852. You may obtain information and comment submissions related to the OMB clearance package by searching on <http://www.regulations.gov> under Docket ID NRC-2015-0070.

You may submit comments on any aspect of these proposed information collections, including suggestions for reducing the burden and on the above issues, by the following methods:

- **Federal rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID NRC-2015-0070.

- **Mail comments to:** Information Services Branch, Office of the Chief Information Officer, Mail Stop: T-2 F43, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001 or to Brandon De Bruhl, Desk Officer, Office of Information and Regulatory Affairs (3150-0014, -0146, -0011, -0151, -0132, -0002, -0039), NEOB-10202, Office of Management and Budget, Washington, DC 20503; telephone: 202-395-0710, e-mail: [oir\\_submission@omb.eop.gov](mailto:oir_submission@omb.eop.gov).

Submit comments by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Comments received after this date will be considered if it is practical to do so, but the NRC staff is able to ensure consideration only for comments received on or before this date.

## Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

### **XIV. Criminal Penalties**

For the purposes of Section 223 of the Atomic Energy Act of 1954, as amended (AEA), the NRC is issuing this proposed rule that would amend or add §§ 26.3, 50.47, 50.54, 50.59, 50.71, 50.75, 50.82, 50.200, 52.110, 72.30, 72.72, 72.212, 72.218, 73.51, 73.54, 73.55, 140.11, and 140.81 as well as appendix G to 10 CFR part 20, appendix A to 10 CFR part 50, and appendix E to 10 CFR part 50, under one or more of Sections 161b, 161i, or 161o of the AEA. Willful violations of these provisions would be subject to criminal enforcement. Criminal penalties as they apply to regulations in 10 CFR parts 20, 26, 50, 52, 72, 73 and 140 are discussed in §§ 20.2402, 26.825, 50.111, 52.303, 72.86, 73.81 and 140.89.

### **XV. Voluntary Consensus Standards**

The National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, requires that Federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies unless the use of such a standard is inconsistent with applicable law or otherwise impractical. In this proposed rule, the NRC would revise regulations associated with decommissioning in 10 CFR parts 20, 26, 50, 51, 52, 72, 73, and 140. This action would not constitute the establishment of a standard that contains generally applicable requirements.

## **XVI. Availability of Guidance**

The NRC is issuing for comment four draft regulatory guides to support the implementation of the proposed requirements in this proposed rule, as well as to support other recommendations made in the supporting regulatory bases regarding areas where the decommissioning guidance could be improved or enhanced. You may access information and comment submissions related to the Draft Guides (DGs) by searching on <http://www.regulations.gov> under Docket ID NRC-2015-0070. You may submit comments on this draft guidance by the methods outlined in the ADDRESSES section of this document.

1. The DG-1346, "Emergency Planning for Decommissioning Nuclear Power Reactors" (ADAMS Accession No. ML17311B018), is a new regulatory guide.

2. The DG-1347, "Decommissioning of Nuclear Power Reactors," (ADAMS Accession No. ML17347A794), would be Revision 2 to the existing Regulatory Guide 1.184.

3. The DG-1348, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors," (ADAMS Accession No. ML17348B485), would be Revision 2 to the existing Regulatory Guide 1.159.

4. The DG-1349, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report," (ADAMS Accession No. ML17353A727), would be Revision 2 to the existing Regulatory Guide 1.185.

## **XVII. Public Meeting**

The NRC will conduct a public meeting on this proposed rule for the purpose of describing this proposed rule to the public and facilitating development of public comments on this proposed rule.

The NRC will publish a notice of the location, time, and agenda of the meeting in the *Federal Register*, on Regulations.gov, and on the NRC's public meeting Web site at least 10 calendar days before the meeting. Stakeholders should monitor the NRC's public meeting Web site for information about the public meeting at:

<http://www.nrc.gov/public-involve/public-meetings/index.cfm>.

## **XVIII. Availability of Documents**

The documents identified in the following table are available to interested persons through one or more of the following methods, as indicated.

<b>DOCUMENT</b>	<b>ADAMS Accession No. / Web link / <i>Federal Register</i> Citation</b>
<b>Proposed Rule Documents</b>	
Draft Regulatory Analysis	ML18012A024
Draft Environmental Assessment and FONSI	ML18023B561
Draft Information Collection Analysis	ML18039A192
<b>Draft Regulatory Guidance Documents</b>	
Draft Regulatory Guide DG-1346, "Emergency Planning for Decommissioning Nuclear Power Reactors"	ML17311B018
Draft Regulatory Guide DG-1347, "Decommissioning of Nuclear Power Reactors"	ML17347A794
Draft Regulatory Guide DG-1348, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors"	ML17348B485

Draft Regulatory Guide DG-1349, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report"	ML17353A727
<b>Other References</b>	
"Bellefonte Nuclear Plant, Units 1 and 2—Withdrawal of Construction Permit Nos. CPPR-122 for Unit 1 and CPPR-123 for Unit 2," dated September 14, 2006	ML061810505
"Energy Northwest Nuclear Project No. 1—Termination of Construction Permit CPPR-134," dated February 8, 2007	ML070220011
"Power Reactor Transition from Operations to Decommissioning: Lessons Learned Report," dated October 31, 2016	ML16085A029
"Risk assessment for physical and cyber attacks on critical infrastructures," Military Communications Conference, 2005. MILCOM 2005. Institute of Electrical and Electronics Engineers. October 2005.	<a href="https://ieeexplore.ieee.org/document/1605959/">https://ieeexplore.ieee.org/document/1605959/</a>
<del>"SFAQ 17-04 Access Authorization / Access Authorization Systems," dated January 2018.</del>	<del>Not Publicly Available</del>
"Status of Regulatory Exemptions for Decommissioning Plants," dated August 16, 2002	ML030550706
COMSECY-13-0030, "Staff Evaluation and Recommendation for Japan Lessons Learned Tier 3 Issue on Expedited Transfer of Spent Fuel"	ML13329A918
Documentation of Evolution of Security Requirements at Commercial Nuclear Power Plants with Respect to Mitigation Measures for Large Fires and Explosions, dated February 4, 2010	ML092990438
Draft Regulatory Basis for Public Comment—Regulatory Improvements for Power Reactors Transitioning to Decommissioning.	ML17047A413
EA-02-026 Issuance of Order for Interim Safeguards and Security Compensatory Measures.	ML020510637
EPA-400-R-92-001, "Manual of Protective Action Guides And Protective Actions For Nuclear Incidents," issued May 1992	<a href="https://www.epa.gov/sites/production/files/2016-03/documents/pags.pdf">https://www.epa.gov/sites/production/files/2016-03/documents/pags.pdf</a>
EPA-400/R-17/001, "PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents," issued January 2017	<a href="https://www.epa.gov/radiation/protective-action-guides-pags">https://www.epa.gov/radiation/protective-action-guides-pags</a>
<i>Federal Register</i> notice—"Washington Public Power Supply System, Washington Nuclear Project, Unit 3; Order Revoking Construction Permit No. CPPR-154," dated January 29, 1999	64 FR 4725
<i>Federal Register</i> notice—Advance Notice of Proposed Rulemaking, "Regulatory Improvements for Decommissioning Power Reactors," dated November 19, 2015	80 FR 72358

<i>Federal Register</i> notice—Direct Final Rule, “Definition of a Utilization Facility,” dated October 17, 2014	79 FR 62329
<i>Federal Register</i> notice—Draft Policy Statement, “Use of Decommissioning Trust Funds before Decommissioning Plan Approval,” dated February 3, 1994	59 FR 5216
<i>Federal Register</i> notice—Draft Regulatory Basis, “Regulatory Improvements for Power Reactors Transitioning to Decommissioning,” dated March 15, 2017	82 FR 13778
<i>Federal Register</i> notice—Final ITAAC Hearing Procedures, “Final Procedures for Conducting Hearings on Conformance With the Acceptance Criteria in Combined Licenses,” dated July 1, 2016	81 FR 43266
<i>Federal Register</i> notice—Final Policy Statement, “Commission Policy Statement on Deferred Plants,” dated October 14, 1987	52 FR 38077
<i>Federal Register</i> notice—Final Rule, “Backfitting of Production and Utilization Facilities; Construction Permits and Operating Licenses,” dated March 31, 1970	35 FR 5317
<i>Federal Register</i> notice—Final Rule, “Consideration of Potassium Iodide in Emergency Plans,” dated January 19, 2001	66 FR 5427
<i>Federal Register</i> notice—Final Rule, “Creditors’ Rights; and Transfer, Surrender, and Termination of Licenses,” dated October 10, 1961	26 FR 9546
<i>Federal Register</i> notice—Final Rule, “Decommissioning of Nuclear Power Reactors,” dated July 29, 1996	61 FR 39278
<i>Federal Register</i> notice—Final Rule, “Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors,” dated April 18, 1989	54 FR 15372
<i>Federal Register</i> notice—Final Rule, “Emergency Planning and Preparedness,” dated July 13, 1982	47 FR 30232
<i>Federal Register</i> notice—Final Rule, “Emergency Planning,” dated August 19, 1980	45 FR 55402
<i>Federal Register</i> notice—Final Rule, “Enhancements to Emergency Preparedness Regulations,” dated November 23, 2011	76 FR 72559
<i>Federal Register</i> notice—Final Rule, “Fitness for Duty Programs,” dated March 31, 2008	73 FR 16966
<i>Federal Register</i> notice—Final Rule, “General Requirements for Decommissioning Nuclear Facilities,” dated June 27, 1988	53 FR 24018

<i>Federal Register</i> notice—Final Rule, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” dated August 27, 2007	72 FR 49351
<i>Federal Register</i> notice—Final Rule, “Power Reactor Security Requirements,” dated March 27, 2009	74 FR 13926
<i>Federal Register</i> notice—Final Rule, “Reporting Requirements for Nuclear Power Reactors and Independent Spent Fuel Storage Installations at Power Reactor Sites,” dated October 25, 2000	65 FR 63769
<i>Federal Register</i> notice—Final Rule, “Requirements for Licensee Actions Regarding the Disposition of Spent Fuel Upon Expiration of Reactor Operating Licenses,” dated August 31, 1984	49 FR 34688
<i>Federal Register</i> notice—Final Rule, “Retention Periods for Records; Final Rule,” dated May 27, 1988	53 FR 19240
<i>Federal Register</i> notice—Final Rule, “Revision of Backfitting Process for Power Reactors,” dated June 6, 1988	53 FR 20603
<i>Federal Register</i> notice—Final Rule, “Revision of Backfitting Process for Power Reactors,” dated September 20, 1985	50 FR 38097
<i>Federal Register</i> notice—Policy Statement, “Planning Basis for Emergency Responses to Nuclear Power Reactor Accidents,” dated October 23, 1979	44 FR 61123
<i>Federal Register</i> notice—Policy Statement, “Safety Goals for the Operation of Nuclear Power Plants; Policy Statement; Correction and Republication,” dated August 21, 1986	51 FR 30028
<i>Federal Register</i> notice—Preliminary Draft Regulatory Analysis, “Regulatory Improvements for Power Reactors Transitioning to Decommissioning,” dated May 9, 2017	82 FR 21481
<i>Federal Register</i> notice—Proposed Rule, “Decommissioning of Nuclear Power Reactors,” dated July 20, 1995	60 FR 37374
<i>Federal Register</i> notice—Proposed Rule, “Emergency Planning,” dated December 19, 1979	44 FR 75167
<i>Federal Register</i> notice—Regulatory Basis, “Regulatory Improvements for Power Reactors Transitioning to Decommissioning,” dated November 27, 2017	82 FR 55954
Homeland Security Presidential Directive 5, “Management of Domestic Incidents” dated February 28, 2003	<a href="https://www.dhs.gov/publication/homeland-security-presidential-directive-5">https://www.dhs.gov/publication/homeland-security-presidential-directive-5</a>
IMC 2561, “Decommissioning Power Reactor Inspection Program”	ML031270502

Information Notice 2014-14, "Potential Safety Enhancements to Spent Fuel Pool Storage," dated November 14, 2014	ML14218A493
Inspection Procedure (IP) 71801, "Decommissioning Performance and Status Review at Permanently Shutdown Reactors," dated August 11, 1997	<a href="https://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/ip71801.pdf">https://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/ip71801.pdf</a>
Issuance of Amendment No. 142 to Facility Operating License No. DPR-3 – Yankee Nuclear Power Station (Rowe) (TAC No. M83024), dated August 5, 1992	ML17283A069
Issuance of Amendment No. 190 for Facility Operating License No. NPF-1 to Possession-Only License for Trojan Nuclear Plant (TAC No. M85647), dated May 5, 1993	ML18095A126
Management Directive 8.4, "Management of Facility-Specific Backfitting and Information Collection," dated October 9, 2013	ML12059A460
Memorandum, "Cyber Security Requirements for Decommissioning Nuclear Power Plants," dated December 5, 2016	ML16172A284
Memorandum of Understanding Between the Department of Homeland Security/Federal Emergency Management Agency and Nuclear Regulatory Commission Regarding Radiological Emergency Response, Planning, and Preparedness, dated December 7, 2015	ML15344A371
NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," issued November 2012	ML12326A805
NEI 06-12, Revision 2, "B.5.b Phase 2 & 3 Submittal Guideline," dated December 2006	ML070090060
NEI 10-04, Revision 2, "Identifying Systems and Assets Subject to the Cyber Security Rule," issued July 2012	ML12180A081
NRC Regulatory Issue Summary 2001-07, Rev. 1, 10 CFR 50.75 Reporting and Recordkeeping for Decommissioning Planning, dated January 8, 2009	ML083440158
NSIR/DPR-ISG-01, "Interim Staff Guidance—Emergency Planning for Nuclear Power Plants," dated November 20, 2011	ML113010523
NSIR/DPR-ISG-02, "Interim Staff Guidance: Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants," dated May 11, 2015	ML14106A057
NUREG/BR-0314, Rev. 4, "Protecting Our Nation," dated August 2015	ML15232A263
NUREG/BR-0521, Rev. 1, "Decommissioning Nuclear Power Plants," dated June 2017	ML17177A253



NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," December 1978	ML051390356
NUREG-0586, Supplement 1, Volumes 1 and 2, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors"	ML023470327
NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," issued November 1980	ML040420012
NUREG-0696, "Functional Criteria for Emergency Response Facilities"	ML051390358
NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Section 19.4, "Strategies and Guidance to Address Loss of Large Areas of the Plant Due to Explosions and Fires," Revision 0, dated June 2015	ML13316B202
NUREG-0933, "Resolution of Generic Safety Issues," issued December 2011	<a href="https://www.nrc.gov/sr0933/">https://www.nrc.gov/sr0933/</a>
NUREG-1353, "Regulatory Analysis for the Resolution of Generic Issue 82, 'Beyond Design Basis Accidents in Spent Fuel Pools,'" issued April 1989	ML082330232
NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," issued February 2001	ML010430066
NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor," issued September 2014	ML14255A365
Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012	ML12054A735
Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" dated March 12, 2012	ML12054A679
Presidential Policy Directive (PPD)-8, "National Preparedness" issued March 30, 2011	<a href="https://www.dhs.gov/presidential-policy-directive-8-national-preparedness">https://www.dhs.gov/presidential-policy-directive-8-national-preparedness</a>
Rancho Seco Nuclear Generating Station Amendment No. 117 for Facility Operating License No. DPR-54 to Possession Only License (TAC No. M76825)	ML17283A071

Regulatory Basis for the EP for Small Modular Reactors and Other New Technologies Rulemaking	ML17206A265
RG 1.101, Revision 0, "Emergency Planning for Nuclear Power Plants," dated November 1975	ML13350A291
RG 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report," dated June 2013	ML13140A038
RG 1.219, Revision 1, "Guidance on Making Changes to Emergency Plans for Nuclear Power Reactors," dated July 2016	ML16061A104
SECY-93-127, "Financial Protection Required of Licensees of Large Nuclear Power Plants During Decommissioning," dated May 10, 1993	ML12257A628
SECY-98-253, "Applicability of Plant-Specific Backfit Requirements to Plants Undergoing Decommissioning," dated November 4, 1998	ML992870107
SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," dated June 28, 2000	ML003721626
SECY-01-0100, "Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools," dated June 4, 2001	ML011450420
SECY-04-0176, "Exemption Requests to Reduce Liability Insurance Coverage for Decommissioning Reactors after Transfer of all Spent Fuel from a Spent Fuel Pool to Dry Cask Storage," dated September 29, 2004	ML040850518
SECY-14-0118, "Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements," dated October 29, 2014	ML14219A444
SECY-15-0005, "Recommendation to Sunset to Decommissioning Trust Fund Spot-Check Program," dated January 15, 2015	ML14210A554
SECY-15-0014, "Anticipated Schedule and Estimated Resources for a Power Reactor Decommissioning Rulemaking," dated January 30, 2015 – Redacted	ML15082A089
<del>SECY-15-0127, "Schedule, Resource Estimates, and Impacts for the Power Reactor Decommissioning Rulemaking," dated October 7, 2015</del>	<del>Not Publicly Available</del>
SECY-16-0142, "Draft Final Rule—Mitigation of Beyond-Design-Basis Events," dated December 15, 2016	ML16301A005
SRM-COMSECY-13-0030, "Staff Evaluation and Recommendation for Japan Lessons-Learned Tier 3 Issue on Expedited Transfer of Spent Fuel," dated May 23, 2014	ML14143A360

<del>SRM-COMSECY-16-0020, "Staff Requirements—COMSECY-16-0020—Revision of Guidance Concerning Consideration of Cost and Applicability of Compliance Exception to Backfit Rule," dated November 29, 2019</del>	<del>ML16334A462</del>
SRM-SECY-93-127, "Financial Protection Required of Licensees of Large Nuclear Power plants during Decommissioning," dated July 13, 1993	ML003760936
SRM-SECY-99-168, "Staff Requirements—SECY-99-168—Improving Decommissioning Regulations for Nuclear Power Plants," dated December 21, 1999	ML003752190
SRM-SECY-00-0145, "Staff Requirements—SECY-00-0145—Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," dated September 27, 2000	ML003754381
SRM-SECY-14-0118, "Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements," dated October 29, 2014	ML14364A111
Summary of Public Meeting May 8–10, 2017, Regulatory Improvements for Power Reactors Transitioning to Decommissioning Rulemaking dated November 15, 2017	ML17157B211
Technical Evaluation for the Endorsement of NEI 99-01, Revision 6, dated March 28, 2013	ML12346A463
Transmittal of Reports to Inform Decommissioning Plant Rulemaking for User Need Request NSIR-2015-001, dated May 31, 2016	ML16110A416
V. C. Summer, Units 2 and 3—Request for Withdrawal of COLs, dated December 27, 2017	ML17361A088

Throughout the development of this rule, the NRC may post documents related to this rule, including public comments, on the Federal rulemaking Web site at <http://www.regulations.gov> under Docket ID NRC-2015-0070. The Federal rulemaking Web site allows you to receive alerts when changes or additions occur in a docket folder. To subscribe: 1) Navigate to the docket folder (NRC-2015-0070); 2) click the "Sign up for E-mail Alerts" link; and 3) enter your e-mail address and select how frequently you would like to receive e-mails (daily, weekly, or monthly).

## **List of Subjects**

### **10 CFR part 20**

Byproduct material, Criminal penalties, Hazardous waste, Licensed material, Nuclear energy, Nuclear materials, Nuclear power plants and reactors, Occupational safety and health, Packaging and containers, Penalties, Radiation protection, Reporting and recordkeeping requirements, Source material, Special nuclear material, Waste treatment and disposal.

### **10 CFR part 26**

Administrative practice and procedure, Alcohol abuse, Alcohol testing, Appeals, Chemical testing, Drug abuse, Drug testing, Employee assistance programs, Fitness for duty, Management actions, Nuclear power plants and reactors, Privacy, Protection of information, Radiation protection, Reporting and recordkeeping requirements.

### **10 CFR part 50**

Administrative practice and procedure, Antitrust, Backfitting, Classified information, Criminal penalties, Education, Emergency Planning, Fire prevention, Fire protection, Incorporation by reference, Intergovernmental relations, Nuclear power plants and reactors, Penalties, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements, Whistleblowing.

**10 CFR part 51**

Administrative practice and procedure, Environmental impact statements, Hazardous waste, Nuclear energy, Nuclear materials, Nuclear power plants and reactors, Reporting and recordkeeping requirements.

**10 CFR part 52**

Administrative practice and procedure, Antitrust, Combined license, Early site permit, Emergency planning, Fees, Incorporation by reference, Inspection, Issue finality, Limited work authorization, Nuclear power plants and reactors, Probabilistic risk assessment, Prototype, Reactor siting criteria, Redress of site, Penalties, Reporting and recordkeeping requirements, Standard design, Standard design certification.

**10 CFR part 72**

Administrative practice and procedure, Hazardous waste, Indians, Intergovernmental relations, Nuclear energy, Penalties, Radiation protection, Reporting and recordkeeping requirements, Security measures, Spent fuel, Whistleblowing.

**10 CFR part 73**

Criminal penalties, Exports, Hazardous materials transportation, Incorporation by reference, Imports, Nuclear energy, Nuclear materials, Nuclear power plants and reactors, Penalties, Reporting and recordkeeping requirements, Security measures.

## **10 CFR part 140**

Criminal penalties, Extraordinary nuclear occurrence, Insurance, Intergovernmental relations, Nuclear materials, Nuclear power plants and reactors, Penalties, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 552 and 553, the NRC is proposing to adopt the following amendments to 10 CFR parts 20, 26, 50, 51, 52, 72, 73, and 140:

### **PART 20 – STANDARDS FOR PROTECTION AGAINST RADIATION**

1. The authority citation for part 20 continues to read as follows:

**Authority:** Atomic Energy Act of 1954, secs. 11, 53, 63, 65, 81, 103, 104, 161, 170H, 182, 186, 223, 234, 274, 1701 (42 U.S.C. 2014, 2073, 2093, 2095, 2111, 2133, 2134, 2201, 2210h, 2232, 2236, 2273, 2282, 2021, 2297f), Energy Reorganization Act of 1974, secs. 201, 202 (42 U.S.C. 5841, 5842); Low-Level Radioactive Waste Policy Amendments Act of 1985, sec. 2 (42 U.S.C. 2021b); 44 U.S.C. 3504 note.

#### **Appendix G to Part 20 [Amended]**

2. In appendix G to part 20, in paragraph E.1. of section III., remove the word “or” and add in its place the word “of” and remove the phrase “20 days” and add in its place the phrase, “45 days”.

### **PART 26 – FITNESS FOR DUTY PROGRAMS**

3. The authority citation for part 26 continues to read as follows:

**Authority:** Atomic Energy Act of 1954, secs. 53, 103, 104, 107, 161, 223, 234, 1701 (42 U.S.C. 2073, 2133, 2134, 2137, 2201, 2273, 2282, 2297f); Energy Reorganization Act of 1974, secs. 201, 202 (42 U.S.C. 5841, 5842); 44 U.S.C. 3504 note.

4. In § 26.3, revise paragraph (a) to read as follows:

**§ 26.3 Scope.**

(a)(1) Each holder of an operating license for a nuclear power reactor under part 50 of this chapter that receives the license after March 31, 2008, and holders of a combined license under part 52 of this chapter after the Commission has made the finding under § 52.103(g) of this chapter must implement the FFD program before the receipt of special nuclear material in the form of fuel assemblies.

(2) Each holder of an operating license for a nuclear power reactor under part 50 of this chapter and each holder of a combined license under part 52 of this chapter for which the Commission has made the finding under § 52.103(g) of this chapter must comply with the requirements of this part, except for subpart K of this part, until the NRC's docketing of the license holder's certifications required under § 50.82(a)(1) or § 52.110(a) of this chapter.

\* \* \* \* \*

**§ 26.825 [Amended]**

5. In § 26.825(b), remove the number "26.3".

**PART 50 – DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION  
FACILITIES**

6. The authority citation for part 50 is revised to read as follows:

**Authority:** Atomic Energy Act of 1954, secs. 11, 53, 63, 81, 101, 102, 103, 104, 105, 108, 122, 147, 149, 161, 181, 182, 183, 184, 185, 186, 187, 189, 223, 234 (42 U.S.C. 2014, 2073, 2093, 2113, 2131, 2132, 2133, 2134, 2135, 2138, 2152, 2167, 2169, 2201, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2239, 2273, 2282); Energy Reorganization Act of 1974, secs. 201, 202, 206, 211 (42 U.S.C. 5841, 5842, 5846, 5851); Nuclear Waste Policy Act of 1982, sec. 306 (42 U.S.C. 10226); National Environmental Policy Act of 1969 (42 U.S.C. 4332); 44 U.S.C. 3504 note; Sec. 109, Pub. L. 96-295, 94 Stat. 783.

7. Revise § 50.1 to read as follows:

**§ 50.1 Basis, purpose, and procedures applicable.**

The regulations in this part are promulgated by the Nuclear Regulatory Commission pursuant to the Atomic Energy Act of 1954, as amended (68 Stat. 919), and Title II of the Energy Reorganization Act of 1974 (88 Stat. 1242), to provide for the licensing of production and utilization facilities through the termination of the associated 10 CFR part 50 licenses. This part also gives notice to all persons who knowingly provide to any licensee, applicant, contractor, or subcontractor, components, equipment, materials, or other goods or services, that relate to a licensee's or applicant's activities subject to this part, that they may be individually subject to NRC enforcement action for violation of § 50.5.

8. In § 50.2, revise the definition for *Certified fuel handler* and add the definition for *Non-power production or utilization facility* in alphabetical order to read as follows:

**§ 50.2 Definitions.**

\* \* \* \* \*

*Certified fuel handler* means, for a nuclear power reactor facility, either

(1) A non-licensed operator who has qualified in accordance with a fuel handler training



program approved by the Commission; or

(2) A non-licensed operator who meets the following criteria:

(i) Has qualified in accordance with a fuel handler training program that meets the same requirements as training programs for non-licensed operators required by § 50.120 of this part, and

(ii) Is responsible for decisions on:

(A) Safe conduct of decommissioning activities;

(B) Safe handling and storage of spent fuel; and

(C) Appropriate response to plant emergencies.

\* \* \* \* \*

*Non-power production or utilization facility* means a non-power reactor, testing facility, or other production or utilization facility, licensed under § 50.21(a), § 50.21(c), or § 50.22 of this part, that is not a nuclear power reactor or fuel reprocessing plant.

\* \* \* \* \*

9. In § 50.4, revise paragraph (b)(9) to read as follows:

**§ 50.4 Written communications.**

\* \* \* \* \*

(b) \* \* \*

(9) *Certification of permanent fuel removal.* The licensee's certification of permanent fuel removal, under § 50.82(a)(1) of this part, must state the date of permanent cessation of operations, the date on which the fuel was removed from the reactor vessel, and the disposition of the fuel, and must be submitted to the NRC's Document Control Desk. This submission must be under oath or affirmation.

\* \* \* \* \*

10. Revise § 50.38 to read as follows:

**§ 50.38 Ineligibility of certain applicants.**

(a) Any person who is a citizen, national, or agent of a foreign country, or any corporation, or other entity which the Commission knows or has reason to believe is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government, shall be ineligible to apply for and obtain a license.

(b) The prohibition of paragraph (a) of this section does not apply to a person, corporation, or other entity seeking a license for a facility that meets the criteria of § 50.82(a)(2)(ii), § 50.82(b)(6), or § 52.110(b)(2) of this chapter.

11. In § 50.47, revise paragraph (b) introductory text and add paragraph (f) to read as follows:

**§ 50.47 Emergency plans.**

\* \* \* \* \*

(b) The onsite and, except as provided in paragraphs (d) and (f) of this section, offsite emergency response plans for nuclear power reactors must meet the following standards:

\* \* \* \* \*

(f) The planning standards of paragraph (b) of this section do not apply to offsite radiological emergency response plans if the licensee's emergency plan is not required to meet these planning standards or if the plume exposure pathway EPZ does not extend beyond the site boundary.

**§ 50.51 Continuation of license. [Amended]**

12. In § 50.51, remove the words “to authorize ownership and possession of the production or utilization facility,” wherever they appear.

13. In § 50.54:

a. Revise footnote 2 to the table in paragraph (m)(2)(i);

b. Redesignate paragraphs (p)(3) and (4) as paragraphs (p)(5) and (6);

c. Redesignate paragraphs (p)(1) and (2) as paragraphs (p)(2) and (3)

and revise newly redesignated paragraphs (p)(2) and (3);

d. Add new paragraphs (p)(1) and (4);

e. Revise paragraphs (q)(1) introductory text and (q)(1)(iii) and (q)(2) and (3);

f. Remove the words “after February 21, 2012” wherever they appear in paragraphs (q)(4) and (5); and

g. Add paragraphs (q)(7) and (8);

h. Remove the words “after April 1, 1981,” in paragraph (s)(2)(ii);

i. In paragraph (s)(3), remove the words “The NRC” and add in their place the words “If the planning standards for radiological emergency preparedness apply to offsite radiological emergency response plans, the NRC”;

j. In paragraph (t)(1)(ii), remove the “.” from the 2<sup>nd</sup> sentence and add in its place the word “or,”;

k. Add paragraphs (t)(1)(iii), (t)(3), and (w)(5) through (6); and

l. Revise paragraph (bb).

The revisions and additions read as follows:

**§ 50.54 Conditions of licenses.**

\* \* \* \* \*

(m)\* \* \*

(2)\* \* \*

(i)\* \* \*

<sup>2</sup>For the purpose of this table, a nuclear power unit is considered to be operating when it is in a mode other than cold shutdown or refueling as defined by the unit's technical specifications. A Shift Technical Advisor is not required upon the NRC's docketing of the license holder's certifications required under § 50.82(a)(1) or § 52.110(a) of this chapter.

\* \* \* \* \*

(p) *Security plans*—(1) Definitions for the purpose of this paragraph, (p):

(i) *Change* means an action that results in modification of, addition to, or removal from, the licensee's security plans. All changes are subject to the provisions of this section except where the applicable regulations establish specific criteria for accomplishing a particular change.

(ii) *Decrease in the safeguards effectiveness* means a change or series of changes to an element or component of the security plans referenced in paragraph (p)(2) of this section that reduces or eliminates the licensee's ability to perform or maintain the capabilities set forth in § 73.55(b)(3)(i) of this chapter without compensating changes to other security plan elements or components.

(2) The licensee may not make a change which would decrease the effectiveness of a physical security plan, or guard training and qualification plan, or cyber security plan prepared under § 50.34(c) of this part or § 52.79(a) of this chapter, or part 73 of this chapter, or of the first four categories of information (Background, Generic Planning Base, Licensee Planning Base, Responsibility Matrix) contained in a licensee

safeguards contingency plan prepared under § 50.34(d) of this part or § 52.79(a) of this chapter, or part 73 of this chapter, as applicable, without prior approval of the Commission. A licensee desiring to make such a change shall submit an application for amendment to the licensee's license under § 50.90 of this part.

(3) The licensee may make changes to the security plans referenced in paragraph (p)(2) of this section, without prior Commission approval if the changes do not decrease the safeguards effectiveness of the plan. The licensee shall maintain records of changes to the plans made without prior Commission approval for a period of 3 years from the date of the change, and shall submit, as specified in § 50.4 of this part or § 52.3 of this chapter, a report containing a description of each change within 2 months after the change is made. The licensee shall include a summary of the analysis completed to determine that the change does not decrease the safeguards effectiveness of the plan.

(4) The licensee shall prepare and maintain safeguards contingency plan procedures in accordance with appendix C of part 73 of this chapter for effecting the actions and decisions contained in the Responsibility Matrix of the safeguards contingency plan.

Prior to the safeguards contingency plan being put into effect, the licensee shall have:

(i) All safeguards capabilities specified in the safeguards contingency plan available and functional;

(ii) Detailed procedures developed according to appendix C to part 73 of this chapter available at the licensee's site; and

(iii) All appropriate personnel trained to respond to safeguards incidents as outlined in the plan and specified in the detailed procedures.

\* \* \* \* \*

(q) *Emergency plans*—(1) Definitions for the purpose of this paragraph, (q):

\* \* \* \* \*

(iii) *Emergency planning function* means a capability or resource necessary to prepare for and respond to a radiological emergency.

\* \* \* \* \*

(2) Except as provided in paragraph (q)(7) of this section, a holder of a license under this part, or a combined license under part 52 of this chapter after the Commission makes the finding under § 52.103(g) of this chapter, shall follow and maintain the effectiveness of an emergency plan that meets the requirements in appendix E to this part and, for nuclear power reactor licensees, the planning standards of § 50.47(b) of this part.

(3) The licensee may make changes to its emergency plan without NRC approval only if the licensee performs and retains an analysis demonstrating that the changes do not reduce the effectiveness of the plan and the plan, as changed, continues to meet the applicable requirements in appendix E to this part and, for nuclear power reactor licensees, the planning standards of § 50.47(b) of this part, or the applicable requirements of § 50.200 of this part or § 72.32 of this chapter.

\* \* \* \* \*

(7) Upon the NRC's docketing of the nuclear power reactor licensee's certifications required under § 50.82(a)(1) of this part or § 52.110(a) of this chapter:

(i) Licensees must follow and maintain the effectiveness of an emergency plan that meets the requirements of § 50.200(a) of this part or paragraph (q)(2) of this section.

(ii) After at least 10 months (for a boiling water reactor) or 16 months (for a pressurized water reactor) have elapsed since the date of permanent cessation of operations, licensees must follow and maintain the effectiveness of an emergency plan that meets the planning standards of § 50.200(b) of this part and the requirements in § 50.200(c) of this part, or paragraph (q)(7)(i) of this section.

(A) In lieu of the 10 or 16 month spent fuel decay period in paragraph (q)(7)(ii) of this section, a licensee may submit under § 50.90 of this part a request for NRC approval of an alternative spent fuel decay period.

(B) In support of the request submitted in paragraph (q)(7)(ii)(A) of this section, the licensee must include an analysis demonstrating that the alternative spent fuel decay period ensures that the spent fuel would not heat up to 900 °C in less than 10 hours under adiabatic heatup conditions.

(iii) When all the spent fuel is in dry cask storage, licensees must follow and maintain the effectiveness of an emergency plan that meets the standards in § 72.32(a)(1) through (16) of this chapter, or paragraph (q)(7)(ii) of this section.

(iv) Licensees need not comply with the requirements of this section when all spent fuel has been removed from the site.

(8) The following provisions apply to emergency plan changes to be implemented after the NRC's docketing of the nuclear power reactor licensee's certifications required under § 50.82(a)(1) of this part or § 52.110(a) of this chapter:

(i) Initial plan changes made to comply with the requirements of § 50.200 of this part or § 72.32(a) of this chapter as permitted by paragraph (q)(7)(i), (ii), or (iii) of this section are not reductions in effectiveness of the plan and do not need to be submitted to the NRC for prior approval. These plan changes must be submitted to the NRC at least 60 days prior to implementation, as specified in § 50.4 of this part. Subsequent plan changes must be made under paragraphs (q)(3) and (4) of this section, or licensees may follow the change process under § 72.44(f) of this chapter if the emergency plan meets the requirements in § 72.32(a) of this chapter.

(ii) For structures, systems, and components that are no longer needed to provide support for an emergency planning function as defined in paragraph (q)(1)(iii) of this

section, licensees may make a determination under paragraph (q)(3) of this section that changes to the emergency plan are not reductions in effectiveness if the Final Safety Analysis Report demonstrates that these structures, systems, and components are no longer required to be in service due to the decommissioning status of the facility.

(iii) Changes to emergency action levels based on plant conditions that are not physically achievable or instrumentation that is no longer in service due to the decommissioning status of the facility, are not reductions in effectiveness provided that the evaluation under paragraph (q)(3) of this section demonstrates that these changes do not reduce the capability of the emergency plan to take timely and appropriate protective actions.

\* \* \* \* \*

(t)\*\*\*

(1)\*\*\*

(iii) At intervals not to exceed 24 months after the NRC's docketing of the licensee's certifications required under § 50.82(a)(1) of this part or § 52.110(a) of this chapter.

\* \* \* \* \*

(3) The review of the emergency preparedness program elements is no longer required once all fuel is in dry cask storage.

\* \* \* \* \*

(w)\*\*\*

(5) Each power reactor licensee under this part for a production or utilization facility of the type described in § 50.21(b) or § 50.22 of this part shall have and maintain financial protection in an amount of at least \$50,000,000 for each nuclear reactor:

(i) For which the NRC has docketed the certifications required under § 50.82(a)(1) of this part or § 52.110(a) of this chapter; and



(ii) For which at least 10 months (for a boiling water reactor) or 16 months (for a pressurized water reactor) have elapsed since the date of permanent cessation of operations, or for which an NRC-approved alternative to the 10 or 16 month spent fuel decay period, submitted under § 50.54(q)(7)(ii)(A) and (B) of this part, has elapsed.

(6) The licensee shall promptly notify the Commission of any material change in proof of financial protection or in other financial information filed with the Commission under this part.

\* \* \* \* \*

(bb) *Irradiated Fuel Management Plan* (1) The licensee must submit an irradiated fuel management plan (IFMP) to the NRC no later than the date of submission of the post-shutdown decommissioning activities report required by § 50.82(a)(4)(i) of this part or § 52.110(d)(1) of this chapter and before starting to decommission structures, systems, and components needed for moving, unloading, and shipping the irradiated fuel.

(2) The IFMP must contain a discussion of the licensee's planned actions for managing irradiated fuel and how those actions will be consistent with NRC requirements for licensed possession of irradiated fuel until title to, and possession of, the irradiated fuel is transferred to the Secretary of Energy.

(3) The IFMP must identify any actions for managing irradiated fuel that will require NRC authorization.

(4) The IFMP must contain the projected cost of managing irradiated fuel and discuss how the licensee will provide funding for the management of the irradiated fuel following permanent cessation of operations until title to, and possession of, the irradiated fuel is transferred to the Secretary of Energy.

(5) The licensee must notify the NRC in writing before performing any activities involving decommissioning of structures, systems, and components needed for moving,

unloading, and shipping of the irradiated fuel that are inconsistent with the discussion in the IFMP.

(6) The licensee must retain a copy of the IFMP as a record until termination of the operating license issued under this part or combined license issued under part 52 of this chapter.

\* \* \* \* \*

14. In § 50.59, revise paragraph (d)(3) to read as follows:

**§ 50.59 Changes, tests and experiments.**

\* \* \* \* \*

(d)<sup>\*\*\*</sup>

(3) Except as specified in § 50.71(c)(2) of this part, the records of changes in the facility must be maintained until the termination of an operating license issued under this part, a combined license issued under part 52 of this chapter, or a renewed license issued under part 54 of this chapter. Records of changes in procedures and records of tests and experiments must be maintained for a period of 5 years.

15. In § 50.71, revise paragraph (c) to read as follows:

**§ 50.71 Maintenance of records, making of reports.**

\* \* \* \* \*

(c)(1) Records that are required by the regulations in this part or part 52 of this chapter, by license condition, or by technical specifications must be retained for the period

specified by the appropriate regulation, license condition, or technical specification. If a retention period is not otherwise specified, these records must be retained until the Commission terminates the facility license, except as specified in paragraph (c)(2) of this section, or, in the case of an early site permit, until the permit expires.

(2) Licensees for which the NRC has docketed the certifications required under § 50.82(a)(1) of this part or § 52.110(a) of this chapter are not required to retain records associated with structures, systems, and components that have been permanently removed from service under the NRC license using an NRC-approved change process.

\* \* \* \* \*

16. In § 50.75:

- a. Revise the first sentence in paragraph (a);
- b. Revise paragraphs (b)(1), (3), and (4) and add paragraph (b)(5);
- c. Revise paragraph (e)(1) introductory text;
- d. In paragraph (e)(1)(i):
  - i. Remove the phrase “formulas in § 50.75(c)” and add in its place the phrase “table of minimum amounts in paragraph (c)”;
  - ii. Remove the phrase “site-specific estimate” wherever it appears and add in its place the phrase “site-specific decommissioning cost estimate”;
- e. In paragraph (e)(1)(ii) introductory text, remove the phrase “site-specific estimate” wherever it appears and add in its place the phrase “site-specific decommissioning cost estimate”;
- f. Revise paragraph (f)(1), remove paragraph (f)(2), redesignate paragraphs (f)(3) through (5) as (f)(2) through (4) and revise newly redesignated paragraph (f)(2) and paragraph (f)(3) introductory text;

g. In paragraphs (h)(1)(iii) and (iv), remove the words “Director, Office of Nuclear Reactor Regulation, Director, Office of New Reactors, or Director, Office of Nuclear Material Safety and Safeguards, as applicable,” where they appear in the 1<sup>st</sup> sentence of each paragraph and add in their place, the words, “Document Control Desk as specified in § 50.4”.

h. In paragraph (h)(2), remove the words “given the Director, Office of Nuclear Reactor Regulation, Director, Office of New Reactors, or Director, Office of Nuclear Material Safety and Safeguards, as applicable,” wherever they appear and add in their place, the words, “given to the Document Control Desk as specified in § 50.4”.

The revisions and addition read as follows:

**§ 50.75 Reporting and recordkeeping for decommissioning planning.**

(a) This section establishes requirements for indicating to NRC how a licensee will provide reasonable assurance that funds will be available to decommission the facility, as defined in § 50.2 of this part. \*\*\*

\* \* \* \* \*

(b)\* \* \*

(1) For an applicant for or holder of an operating license under this part, the report must contain a certification that reasonable assurance that funds will be available to decommission the facility will be (for a license applicant), or has been (for a license holder), provided in an amount which may be more, but not less, than the amount stated in the table of minimum amounts in paragraph (c)(1) of this section, adjusted using a rate at least equal to that stated in paragraph (c)(2) of this section. For an applicant for a combined license under subpart C of part 52 of this chapter, the report must contain a certification that reasonable assurance of funds to decommission will be provided no

later than 30 days after the Commission publishes notice in the *Federal Register* under § 52.103(a) of this chapter in an amount which may be more, but not less, than the amount stated in the table of minimum amounts in paragraph (c)(1) of this section, adjusted using a rate at least equal to that stated in paragraph (c)(2) of this section.

\* \* \* \* \*

(3) The amount must be covered by one or more of the methods described in paragraph (e) of this section.

(4) The amount stated in the applicant's or licensee's certification may be based on a site-specific decommissioning cost estimate for decommissioning the facility. The site-specific decommissioning cost estimate may be more, but not less, than the amount stated in the table of minimum amounts in paragraph (c)(1) of this section, adjusted using a rate at least equal to that stated in paragraph (c)(2) of this section.

(5) As part of the certification, a copy of the financial instrument obtained to satisfy the requirements of paragraph (e) of this section must be submitted to NRC; *provided, however,* that an applicant for or holder of a combined license need not obtain such financial instrument or submit a copy to the Commission except as provided in paragraph (e)(3) of this section.

\* \* \* \* \*

(e)(1) Reasonable ~~financial~~ assurance of funds to decommission is to be provided by the following methods:

\* \* \* \* \*

(f)(1) Each power reactor licensee shall report, on a calendar-year basis, to the NRC by March 31, 2021, and at least once every 3 years thereafter on the status of its decommissioning funding provided by the financial assurance methods described in paragraph (e)(1) of this section for each reactor or part of a reactor that it owns.

However, each holder of a combined license under part 52 of this chapter need not begin reporting until the date that the Commission has made the finding under § 52.103(g) of this chapter. The information in this report must include, at a minimum, the amount of decommissioning funds estimated to be required pursuant to paragraphs (b) and (c) of this section; the amount of decommissioning funds accumulated to the end of the calendar year preceding the date of the report; a schedule of the annual amounts remaining to be collected; the assumptions used regarding rates of escalation in decommissioning costs, rates of earnings on decommissioning funds, and rates of other factors used in funding projections; any contracts upon which the licensee is relying pursuant to paragraph (e)(1)(v) of this section; any modifications occurring to a licensee's current method of providing financial assurance since the last submitted report; and any material changes to trust agreements. If any of the preceding items is not applicable, the licensee should so state in its report. If the projected balance of any decommissioning funds does not cover the estimated cost of decommissioning, the licensee must include additional financial assurance to cover the shortfall by the time the next report is due. Once a licensee has determined that it is within 5 years of permanent cessation of operations, or if it is involved in a merger or an acquisition, it shall submit this report annually.

(2) Each power reactor licensee shall at or about 5 years prior to the projected end of operations submit a preliminary site-specific decommissioning cost estimate which includes an up-to-date assessment of the major factors that could affect the cost to decommission.

(3) Each non-power reactor licensee shall at or about 2 years prior to the projected end of operations submit a preliminary decommissioning plan containing a site-specific decommissioning cost estimate and an up-to-date assessment of the major factors that

could affect planning for decommissioning. Factors to be considered in submitting this preliminary decommissioning plan information include—

\* \* \* \* \*

17. In § 50.82:

- a. Revise paragraphs (a)(2), (a)(4), (a)(6)(ii), (a)(8)(ii), (a)(8)(vii), and (a)(8)(v) introductory text;
- b. Add paragraph (a)(8)(viii);
- c. Revise paragraphs (a)(9) introductory text and (a)(9)(ii)(F); and
- d. Remove, in paragraph (a)(8)(i)(A), the phrase “legitimate decommissioning” where it appears before the word activities;
- e. Revise paragraph (b)(2) introductory text;
- f. Redesignate paragraph (b)(6) as (b)(8) and add new paragraphs (b)(6) and (7).

The revisions and additions read as follows:

**§ 50.82 Termination of license.**

\* \* \* \* \*

(a)<sup>\*\*\*</sup>

- (2)(i) Upon the NRC’s docketing of the licensee’s certifications required under paragraph (a)(1) of this section, or when a final legally effective order to permanently cease operations has come into effect, the 10 CFR part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel.
- (ii) The facility licensed under this part is no longer a utilization facility once the licensee meets the criteria of paragraph (a)(2)(i) of this section and modifies the facility to be

incapable of making use of special nuclear material without significant facility alterations necessary to restore the capability to make use of special nuclear material. The NRC maintains the authority to regulate the 10 CFR part 50 license with respect to the possession of special nuclear material, source material, and byproduct material under sections 53, 63, 81, and 161 of the Act, as applicable. Until the termination of the 10 CFR part 50 license under paragraph (a)(11) of this section, the regulations of this chapter applicable to a utilization facility continue to apply to the holder of the license unless the regulations explicitly state otherwise.

\* \* \* \* \*

(4)(i) Prior to or within 2 years following permanent cessation of operations, the licensee shall submit a post-shutdown decommissioning activities report (PSDAR) to the NRC, and a copy to the affected State(s). The PSDAR must contain a description of the planned decommissioning activities along with a schedule for their accomplishment, a discussion that provides whether the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate federally issued environmental review documents, and a site-specific decommissioning cost estimate.

(ii) The NRC shall notice in the Federal Register the receipt of the PSDAR and the availability for public comment of the PSDAR and the Irradiated Fuel Management Plan required by § 50.54(bb) of this part. The NRC shall also schedule a public meeting in the vicinity of the licensee's facility upon receipt of the PSDAR. The NRC shall include a notice in a forum, such as local newspapers, that is readily accessible to individuals in the vicinity of the site, and in the *Federal Register* notice required by this paragraph, announcing the date, time and location of the meeting, along with a brief description of the purpose of the meeting.

\* \* \* \* \*



(6)<sup>\*\*\*</sup>

(ii) Result in significant environmental impacts not bounded by appropriate federally issued environmental review documents; or

\* \* \* \* \*

(8)<sup>\*\*\*</sup>

(ii) Initially, 3 percent of the generic amount specified in § 50.75(b) and (c) of this part may be used for decommissioning planning. For licensees that have submitted the certifications required under § 50.82(a)(1) of this part and commencing 90 days after the NRC has received the PSDAR, an additional 20 percent may be used. A site-specific decommissioning cost estimate must be submitted to the NRC prior to the licensee using any funding in excess of these amounts.

\* \* \* \* \*

(v) After submitting its site-specific decommissioning cost estimate required by paragraph (a)(4)(i) of this section, and until the licensee has completed its final radiation survey and demonstrated that residual radioactivity has been reduced to a level that permits termination of its license, the licensee must annually submit to the NRC, by March 31, a financial assurance status report. The report may combine the reporting requirements of § 72.30 of this chapter and § 50.82(a)(8)(vii) of this part. The report must include the following information, current through the end of the previous calendar year:

\* \* \* \* \*

(vii) After submitting its site-specific decommissioning cost estimate required by paragraph (a)(4)(i) of this section, if spent fuel is on site, the licensee must annually submit to the NRC, by March 31, a report on the status of its funding for managing

irradiated fuel. The report must include the following information, current through the end of the previous calendar year:

\* \* \* \* \*

(viii) A licensee may use § 50.75 decommissioning trust funds for spent fuel management and 10 CFR part 72 specific license ISFSI decommissioning expenses provided the following conditions are met:

(A) The NRC has docketed the licensee's certifications required under § 50.82(a)(1) of this part;

(B) At least 90 days have passed since the NRC has received the licensee's PSDAR; and

(C) The licensee continues to meet § 50.82(a)(8)(i)(B) and (C) of this part.

(9) All power reactor licensees that commenced operation must submit an application for termination of license. The application for termination of license must be accompanied or preceded by a license termination plan to be submitted for NRC approval.

\* \* \* \* \*

(ii)<sup>\*\*\*</sup>

(F) An updated site-specific estimate of remaining decommissioning costs and identification of sources of funds for license termination, spent fuel management, and ISFSI decommissioning, as applicable;

\* \* \* \* \*

(b) For non-power production or utilization facilities and fuel reprocessing plants—

\* \* \* \* \*

(6) The facility licensed under this part is no longer a production or utilization facility once the following criteria are met:

(i) The NRC removes the licensee's authority to operate the facility through a license

amendment; and

(ii) The licensee modifies the facility to be incapable of the production of special nuclear material, separation of the isotopes of plutonium, processing of irradiated materials containing special nuclear material, or making use of special nuclear material, without significant facility alterations necessary to restore the capability to produce special nuclear material, separate the isotopes of plutonium, process irradiated materials containing special nuclear material, or make use of special nuclear material.

(7) For a facility licensed under this part that is no longer a production or utilization facility under paragraph (b)(6) of this section, the NRC maintains the authority to regulate the 10 CFR part 50 license with respect to the possession of special nuclear material, source material, and byproduct material under sections 53, 63, 81, and 161 of the Act, as applicable. Until the termination of the 10 CFR part 50 license under paragraph (b)(8) of this section, the regulations of this chapter applicable to a non-power production or utilization facility or fuel reprocessing plant continue to apply to the holder of the license unless the regulations explicitly state otherwise.

\* \* \* \* \*

18. Revise § 50.109 to read as follows:

**§ 50.109 Backfitting.**

(a) *Backfitting for nuclear power reactor licensees prior to decommissioning.*

(1)(i) *Definition.* Backfitting is defined as the modification of or addition to systems, structures, components, or design of a facility; or the design approval or manufacturing license for a facility; or the procedures or organization required to design, construct or operate a facility; any of which may result from a new or amended provision in the

Commission's regulations or the imposition of a regulatory staff position interpreting the Commission's regulations that is either new or different from a previously applicable staff position after:

- (A) The date of issuance of the construction permit for the facility for facilities having construction permits issued after October 21, 1985;
- (B) Six (6) months before the date of docketing of the operating license application for the facility for facilities having construction permits issued before October 21, 1985;
- (C) The date of issuance of the operating license for the facility for facilities having operating licenses;
- (D) The date of issuance of the design approval under subpart E of part 52 of this chapter;
- (E) The date of issuance of a manufacturing license under subpart F of part 52 of this chapter;
- (F) The date of issuance of the first construction permit issued for a duplicate design under appendix N of this part; or
- (G) The date of issuance of a combined license under subpart C of part 52 of this chapter, provided that if the combined license references an early site permit, the provisions in § 52.39 of this chapter apply with respect to the site characteristics, design parameters, and terms and conditions specified in the early site permit. If the combined license references a standard design certification rule under subpart B of 10 CFR part 52, the provisions in § 52.63 of this chapter apply with respect to the design matters resolved in the standard design certification rule, provided however, that if any specific backfitting limitations are included in a referenced design certification rule, those limitations shall govern. If the combined license references a standard design approval under subpart E of 10 CFR part 52, the provisions in § 52.145 of this chapter apply with

respect to the design matters resolved in the standard design approval. If the combined license uses a reactor manufactured under a manufacturing license under subpart F of 10 CFR part 52, the provisions of § 52.171 of this chapter apply with respect to matters resolved in the manufacturing license proceeding.

(ii) *Proposed backfitting.* Except as provided in paragraph (a)(1)(iv) of this section, the Commission shall require a systematic and documented analysis pursuant to paragraph (a)(2) of this section for backfits which it seeks to impose.

(iii) *Backfit analysis.* Except as provided in paragraph (a)(1)(iv) of this section, the Commission shall require the backfitting of a facility only when it determines, based on the analysis described in paragraph (a)(2) of this section, that there is a substantial increase in the overall protection of the public health and safety or the common defense and security to be derived from the backfit and that the direct and indirect costs of implementation for that facility are justified in view of this increased protection.

(iv) *Exceptions.* The provisions of paragraphs (a)(1)(ii) and (iii) of this section are inapplicable and, therefore, backfit analysis is not required and the standards in paragraph (a)(1)(iii) of this section do not apply where the Commission or staff, as appropriate, finds and declares, with appropriated documented evaluation for its finding, either:

(A) That a modification is necessary to bring a facility into compliance with a license or the rules or orders of the Commission, or into conformance with written commitments by the licensee; or

(B) That regulatory action is necessary to ensure that the facility provides adequate protection to the health and safety of the public and is in accord with the common defense and security; or

(C) That the regulatory action involves defining or redefining what level of protection to the public health and safety or common defense and security should be regarded as adequate.

(v) *Mandatory backfitting.* The Commission shall always require the backfitting of a facility if it determines that such regulatory action is necessary to ensure that the facility provides adequate protection to the health and safety of the public and is in accord with the common defense and security.

(vi) *Documented evaluation.* The documented evaluation required by paragraph (a)(1)(iv) of this section shall include a statement of the objectives of and reasons for the modification and the basis for invoking the exception. If immediately effective regulatory action is required, then the documented evaluation may follow rather than precede the regulatory action. ~~The documented evaluation required by paragraph (a)(1)(iv)(A) of this section must include a consideration of the costs of imposing the modification.~~

(vii) *Implementation.* If there are two or more ways to achieve compliance with a license or the rules or orders of the Commission, or with written licensee commitments, or there are two or more ways to reach a level of protection which is adequate, then ordinarily the applicant or licensee is free to choose the way which best suits its purposes. However, should it be necessary or appropriate for the Commission to prescribe a specific way to comply with its requirements or to achieve adequate protection, then cost may be a factor in selecting the way, provided that the objective of compliance or adequate protection is met.

(2) *Backfit analysis factors.* In reaching the determination required by paragraph (a)(1)(iii) of this section, the Commission will consider how the backfit should be scheduled in light of other ongoing regulatory activities at the facility and, in addition, will

consider information available concerning any of the following factors as may be appropriate and any other information relevant and material to the proposed backfit:

- (i) Statement of the specific objectives that the proposed backfit is designed to achieve;
- (ii) General description of the activity that would be required by the licensee or applicant in order to complete the backfit;
- (iii) Potential change in the risk to the public from the accidental off-site release of radioactive material;
- (iv) Potential impact on radiological exposure of facility employees;
- (v) Installation and continuing costs associated with the backfit, including the cost of facility downtime or the cost of construction delay;
- (vi) The potential safety impact of changes in plant or operational complexity, including the relationship to proposed and existing regulatory requirements;
- (vii) The estimated resource burden on the NRC associated with the proposed backfit and the availability of such resources;
- (viii) The potential impact of differences in facility type, design or age on the relevancy and practicality of the proposed backfit;
- (ix) Whether the proposed backfit is interim or final and, if interim, the justification for imposing the proposed backfit on an interim basis.

(3) *Impact on licensing actions.* No licensing action will be withheld during the pendency of backfit analyses required by the Commission's rules.

(b) *Backfitting for decommissioning nuclear power reactor licensees.*

(1) *Definition.* Backfitting is defined as the modification of or addition to systems, structures, or components still in operation during the decommissioning of the licensee's facility, or the design of the licensee's facility, or the procedures or organization required to decommission the facility, any of which may result from a new or amended provision

in the Commission rules or the imposition of a regulatory staff position interpreting the Commission rules that is either new or different from a previously applicable staff position, after the date of issuance of the operating license issued under this part or combined license issued under subpart C of part 52 of this chapter.

(2) *Proposed backfits.* Except as provided in paragraph (b)(4) of this section, the Commission shall require a systematic and documented analysis pursuant to paragraph (b)(8) of this section for backfits that it seeks to impose.

(3) *Backfit analysis.* Except as provided in paragraph (b)(4) of this section, the Commission shall require the backfitting of a facility only when it determines, based on the analysis described in paragraph (b)(8) of this section, that there is a substantial increase in the overall protection of the public health and safety or the common defense and security to be derived from the backfit and that the direct and indirect costs of implementation for that facility are justified in view of this increased protection.

(4) *Exceptions.* The provisions of paragraphs (b)(2) and (3) of this section are inapplicable and, therefore, backfit analysis is not required and the standards in paragraph (b)(3) of this section do not apply where the Commission or staff, as appropriate, finds and declares, with appropriated documented evaluation for its finding, either:

(i) That a modification is necessary to bring a facility into compliance with a license or the rules or orders of the Commission, or into conformance with written commitments by the licensee;

(ii) That regulatory action is necessary to ensure that the facility provides adequate protection to the health and safety of the public and is in accord with the common defense and security; or



(iii) That the regulatory action involves defining or redefining what level of protection to the public health and safety or common defense and security should be regarded as adequate.

(5) *Mandatory backfitting.* The Commission shall always require the backfitting of a facility if it determines that such regulatory action is necessary to ensure that the facility provides adequate protection to the health and safety of the public and is in accord with the common defense and security.

(6) *Documented evaluation.* The documented evaluation required by paragraph (b)(4) of this section shall include a statement of the objectives of and reasons for the modification and the basis for invoking the exception. If immediately effective regulatory action is required, then the documented evaluation may follow rather than precede the regulatory action. ~~The documented evaluation required by paragraph (b)(4)(i) of this section must include a consideration of the costs of imposing the modification.~~

(7) *Implementation.* If there are two or more ways to achieve compliance with a license or the rules or orders of the Commission, or with written licensee commitments, or there are two or more ways to reach a level of protection that is adequate, then ordinarily the licensee is free to choose the way that best suits its purposes. However, should it be necessary or appropriate for the Commission to prescribe a specific way to comply with its requirements or to achieve adequate protection, then cost may be a factor in selecting the way, provided that the objective of compliance or adequate protection is met.

(8) *Backfit analysis factors.* In reaching the determination required by paragraph (b)(3) of this section, the Commission will consider how the backfit should be scheduled in light of other ongoing regulatory activities at the facility and, in addition, will consider

information available concerning any of the following factors as may be appropriate and any other information relevant and material to the proposed backfit:

(i) Statement of the specific objectives that the proposed backfit is designed to achieve;

(ii) General description of the activity that would be required by the licensee in order to complete the backfit;

(iii) Potential change in the risk to the public from the accidental off-site release of radioactive material;

(iv) Potential impact on radiological exposure of facility employees;

(v) Installation and continuing costs associated with the backfit, including the cost of decommissioning delay;

(vi) The potential safety impact of changes in major decommissioning activities, including the relationship to proposed and existing regulatory requirements;

(vii) The estimated resource burden on the NRC associated with the proposed backfit and the availability of such resources;

(viii) The potential impact of differences in facility type and the percentage of decommissioning completed on the relevancy and practicality of the proposed backfit; and

(ix) Whether the proposed backfit is interim or final and, if interim, the justification for imposing the proposed backfit on an interim basis.

(9) *Impact on licensing actions.* No licensing action will be withheld during the pendency of backfit analyses required by the Commission's rules.

(c) *Responsibility for implementation.* The Executive Director for Operations shall be responsible for implementation of this section, and all analyses required by this section shall be approved by the Executive Director for Operations or his designee.

19. Add § 50.200 to read as follows:

**§ 50.200 Power reactor decommissioning emergency plans.**

(a) *Post-shutdown emergency plans (PSEP)*. If the licensee elects in § 50.54(q)(7)(i) of this part to comply with this section, then the licensee's onsite emergency response plans must meet the planning standards of § 50.47(b) of this part and the requirements in appendix E to this part. For a PSEP, emergency response organization (ERO) staffing required by § 50.47(b)(2) of this part and appendix E to this part may be commensurate with a reduced spectrum of credible accidents for a permanently shutdown and defueled power reactor facility.

(b) *Permanently defueled emergency plans (PDEP)*. If the licensee elects in § 50.54(q)(7)(ii) of this part to comply with this section, then the licensee's onsite emergency response plans must meet the requirements in paragraph (c) of this section and the following planning standards:

(1) Primary responsibilities for emergency response by the nuclear facility licensee and by State and local organizations have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.

(2) On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available and the interfaces among various onsite response activities and offsite support and response activities are specified.

(3) Arrangements for requesting and effectively using assistance resources have been made, and other organizations capable of augmenting the planned response have been identified.

(4) A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee.

(5) Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and followup messages to response organizations has been established.

(6) Provisions exist for prompt communications among principal response organizations to emergency personnel.

(7) The principal points of contact with the news media for dissemination of information during an emergency are established in advance, and procedures for coordinated dissemination of information to the public are established.

(8) Adequate emergency facilities and equipment to support the emergency response are provided and maintained.

(9) Adequate methods, systems, and equipment for assessing and monitoring actual or potential consequences of a radiological emergency condition are in use.

(10) A range of protective actions has been developed for emergency workers and the public.

(11) Means for controlling radiological exposures in an emergency are established for emergency workers.

(12) Arrangements are made for medical services for contaminated injured individuals.

(13) General plans for recovery and reentry are developed.

(14) Periodic exercises will be conducted to evaluate major portions of emergency response capabilities, periodic drills will be conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills will be corrected.

(15) Radiological emergency response training is provided to those who may be called on to assist in an emergency.

(16) Responsibilities for plan development and review and for distribution of emergency plans are established, and planners are properly trained.

(c) Content of emergency plans.

(1) Emergency plans must contain, but not necessarily be limited to, information needed to demonstrate compliance with the elements set forth below, *i.e.*, organization for coping with radiological emergencies, assessment actions, activation of emergency organization, notification procedures, emergency facilities and equipment, training, maintaining emergency preparedness, and recovery.

(i) Organization.

(A) The organization for coping with radiological emergencies must be described, including definition of authorities, responsibilities, and duties of individuals assigned to the licensee's emergency organization and the means for notification of such individuals in the event of an emergency. Specifically, the following must be included:

(1) A description of the normal plant organization.

(2) A description of the onsite ERO with a detailed discussion of:

(i) Authorities, responsibilities, and duties of the individual(s) who will take charge during an emergency;

(ii) Plant staff emergency assignments;

(iii) Authorities, responsibilities, and duties of an onsite emergency coordinator who shall be in charge of the exchange of information with offsite authorities responsible for coordinating and implementing offsite emergency measures.

(3) Identification, by position and function to be performed, of persons within the licensee organization who will be responsible for making dose projections, and a description of how these projections will be made and the results transmitted to State and local authorities, NRC, and other appropriate governmental entities.

(4) A description of the local offsite services to be provided in support of the licensee's emergency organization.

(5) Identification of assistance expected from appropriate State, local, and Federal agencies with responsibilities for coping with emergencies, including an act directed toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force.

(B) [Reserved]

(ii) Assessment actions.

(A) The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials must be described, including emergency action levels that are to be used as criteria for determining the need for notification and participation of local and State agencies, the Commission, and other Federal agencies, and the emergency action levels that are to be used for determining when and what type of protective measures should be considered within the site boundary to protect health and safety. The emergency action levels must be based on in-plant conditions and instrumentation in addition to onsite monitoring. Emergency

action levels must be reviewed with the State and local governmental authorities on an annual basis.

(B) A licensee desiring to change its entire emergency action level scheme must submit an application for an amendment to its license and receive NRC approval before implementing the change. Licensees must follow the change process in § 50.54(q) for all other emergency action level changes.

(iii) Activation of emergency organization.

(A) The entire spectrum of emergency conditions that involve the alerting or activating of progressively larger segments of the total emergency organization must be described. The communication steps to be taken to alert or activate emergency personnel under each class of emergency must be described. Emergency action levels, based not only on onsite radiation monitoring information but also on readings from a number of sensors that indicate a potential emergency for notification of offsite agencies, must be described. The existence, but not the details, of a message authentication scheme must be noted for such agencies. The emergency classes defined must include:

(1) Notification of unusual events, and

(2) Alert.

(B) Licensees must establish and maintain the capability to assess, classify, and declare an emergency condition as soon as possible and within 60 minutes after the availability of indications to plant operators that an emergency action level has been exceeded and must promptly declare the emergency condition as soon as possible following identification of the appropriate emergency classification level. Licensees must not construe these criteria as a grace period to attempt to restore plant conditions to avoid declaring an emergency action due to an emergency action level that has been exceeded. Licensees must not construe these criteria as preventing implementation of

response actions deemed by the licensee to be necessary to protect public health and safety provided that any delay in declaration does not deny the State and local authorities the opportunity to implement measures necessary to protect the public health and safety.

(iv) Notification procedures.

(A) Administrative and physical means for notifying local, State, and Federal officials and agencies must be described. This description must include identification of the State and local government agencies.

(B) A licensee must have the capability to notify responsible State and local governmental agencies as soon as possible and within 60 minutes after declaring an emergency.

(v) Emergency facilities and equipment. Adequate provisions must be made and described for emergency facilities and equipment, including:

(A) Equipment at the site for personnel monitoring;

(B) Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;

(C) Facilities and supplies at the site for decontamination of onsite individuals;

(D) Facilities and medical supplies at the site for appropriate emergency first aid treatment;

(E) Arrangements for medical service providers qualified to handle radiological emergencies onsite;

(F) Arrangements for transportation of contaminated injured individuals from the site to specifically identified treatment facilities outside the site boundary;

(G) Arrangements for treatment of individuals injured in support of licensed activities on the site at treatment facilities outside the site boundary;



(H) A licensee facility from which effective direction can be given and effective control can be exercised during an emergency;

(I) At least one onsite and one offsite communications system; each system must have a backup power source. All communication plans must have arrangements for emergencies, including titles and alternates for those in charge at both ends of the communication links and the primary and backup means of communication. Where consistent with the function of the governmental agency, these arrangements will include:

(1) Provision for communications with contiguous State and local governments. Such communications must be tested monthly.

(2) Provision for communications with Federal emergency response organizations. Such communications systems must be tested annually.

(3) Provisions for communications by the licensee with NRC Headquarters and the appropriate NRC Regional Office Operations Center from the facility. Such communications must be tested monthly.

(vi) Training.

(A) The training program must provide for:

(1) The training of employees and exercising, by periodic drills, of emergency plans to ensure that employees of the licensee are familiar with their specific emergency response duties, and

(2) The participation in the training and drills by other persons whose assistance may be needed in the event of a radiological emergency. The plan must include a description of specialized initial training and periodic retraining programs to be provided to each of the following categories of emergency personnel:

(j) Directors and/or coordinators of the plant emergency organization;

(ii) Personnel responsible for accident assessment;

(iii) Radiological monitoring teams;

(iv) Fire control teams (fire brigades);

(v) Repair and damage control teams;

(vi) First aid and rescue teams;

(vii) Medical support personnel; and

(viii) Security personnel.

(3) In addition, a radiological orientation training program must be made available to local services personnel, such as local emergency services and local law enforcement personnel.

(B) The plan must describe provisions for the conduct of emergency preparedness exercises as follows: Exercises must test the adequacy of timing and content of implementing procedures and methods, test emergency equipment and communications networks, and ensure that emergency organization personnel are familiar with their duties.<sup>1</sup>

(1) Within two years of the NRC's docketing of the licensee's certifications required under § 50.82(a)(1) of this part or § 52.110(a) of this chapter, each licensee must conduct an exercise of its onsite emergency plan.

(2) Each licensee at each site must conduct a subsequent exercise of its onsite emergency plan every 2 years. In addition, the licensee must take actions necessary to ensure that adequate emergency response capabilities are maintained during the interval between biennial exercises by conducting drills, including at least one drill involving a combination of some of the principal functional areas of the licensee's onsite

---

<sup>1</sup> Use of site-specific simulators or computers is acceptable for any exercise.

emergency response capabilities. The principal functional areas of emergency response include activities such as management and coordination of emergency response, accident assessment, event classification, notification of offsite authorities, assessment of the onsite impact of radiological releases, system repair, and mitigative action implementation. During these drills, activation of all of the licensee's emergency response facilities is not necessary, licensees have the opportunity to consider accident management strategies, supervised instruction is permitted, operating staff in all participating facilities have the opportunity to resolve problems (success paths) rather than have controllers intervene, and the drills may focus on the onsite exercise training objectives.

(3) Licensees must enable any State or local government to participate in the licensee's drills and exercises when requested by such State or local government.

(4) Remedial exercises will be required if the emergency plan is not satisfactorily tested during the biennial exercise, such that NRC cannot: (1) find reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency or (2) determine that the ERO has maintained key skills specific to emergency response.

(5) All exercises, drills, and training that provide performance opportunities to develop, maintain, or demonstrate key skills must provide for formal critiques in order to identify weak or deficient areas that need correction. Any weaknesses or deficiencies that are identified in a critique of exercises, drills, or training must be corrected.

(6) Licensees must use drill and exercise scenarios that provide reasonable assurance that anticipatory responses will not result from preconditioning of participants. Exercise and drill scenarios as appropriate must emphasize coordination among onsite and offsite response organizations.

(vii) Maintaining emergency preparedness.

(A) Provisions to be employed to ensure that the emergency plan, its implementing procedures, and emergency equipment and supplies are maintained up to date must be described.

(B) [Reserved]

(viii) Recovery.

(A) Criteria to be used to determine when, following an accident, reentry of the facility would be appropriate must be described.

(B) [Reserved]

(2) [Reserved]

20. In appendix A to part 50, revise the last sentence of criterion 1 of section I. Overall Requirements to read as follows:

**Appendix A to Part 50--General Design Criteria for Nuclear Power Plants**

\*\*\*\*\*

I. Overall Requirements

*Criterion 1—Quality standards and records.* \*\*\* Appropriate records of the design, fabrication, erection, and testing of structures, systems, and components important to safety shall be maintained by or under the control of the nuclear power unit licensee until the NRC docket the certifications required under § 50.82(a)(1) of this part or § 52.110(a) of this chapter and the licensee concludes, using an NRC-approved change process, that these structures, systems, and components will not in the future serve any safety purpose regulated by the NRC.

\* \* \* \* \*

21. Amend appendix E to part 50 by:
  - a. Removing paragraph I.6;
  - b. In paragraph IV.4, remove the words “of the later of the date” and “or December 23, 2011,”;
  - c. Add paragraph IV.8;
  - d. In paragraph IV.A.7, remove the words, “By June 23, 2014, identification” and add in their place the word, “Identification”;
  - e. In paragraph IV.A.9, remove the words, “By December 24, 2012, for” and add in its place the word, “For”;
  - f. In paragraph IV.B.1, remove the words, “By June 20, 2012, for” and add in their place the word, “For”;
  - g. In paragraph IV.C.2, remove the words, “By June 20, 2012, nuclear” and add in their place the word, “Nuclear”;
  - h. Remove paragraph IV.D.4;
  - i. In paragraph IV.E.8.c introductory text, remove the words, “By June 20, 2012, for” and add in their place the word, “For”;
  - j. In paragraph IV.E.8.d, remove the last sentence;
  - k. In paragraph IV.F.2.d remove the words “and should fully participate in one hostile action exercise by December 31, 2015”;
  - l. In paragraph IV.F.2.j, remove the 5<sup>th</sup> sentence;
  - m. Add paragraph IV.F.2.k;
  - n. In paragraph IV.I, remove the words, “By June 20, 2012, for” and add in their place the word, “For”;
  - o. In paragraph VI.4.a, remove the words, “by October 28, 1991”;

p. In paragraph VI.4.d, remove the words “by February 13, 1993, or” and “, whichever comes later”.

The revisions and addition read as follows:

**Appendix E to Part 50 – Emergency Planning and Preparedness for Production and Utilization Facilities**

\* \* \* \* \*

IV.\*\*\*

8. A nuclear power reactor licensee is not subject to the requirements of paragraphs 4, 5, and 6 of this section once the NRC docket the licensee’s certifications required under § 50.82(a)(1) of this part or § 52.110(a) of this chapter.

\* \* \* \* \*

F.\*\*\*

2.\*\*\*

k. For each nuclear reactor for which the NRC has docketed the certifications required under § 50.82(a)(1) of this part or § 52.110(a) of this chapter, the nuclear reactor’s licensee must follow the biennial exercise requirements of either paragraph 2 of this section or § 50.200(c) of this part.

\* \* \* \* \*

**PART 51 – ENVIRONMENTAL PROTECTION REGULATIONS FOR DOMESTIC LICENSING AND RELATED REGULATORY FUNCTIONS**

22. The authority citation for part 51 continues to read as follows:

**Authority:** Atomic Energy Act of 1954, secs. 161, 193 (42 U.S.C. 2201, 2243) Energy Reorganization Act of 1974, secs. 201, 202 (42 U.S.C. 5841, 5842); National Environmental Policy Act of 1969 (42 U.S.C. 4332, 4334, 4335); Nuclear Waste Policy

Act of 1982, sec. 144(f), 121, 135, 141, 148 (42 U.S.C. 10134(f), 10141, 10155, 10161, 10168); 44 U.S.C. 3504 note.

**§ 51.53 Postconstruction environmental reports. [Amended]**

23. In § 51.53, remove the words “Each applicant for a license amendment authorizing decommissioning activities for a production or utilization facility either for unrestricted use or based on continuing use restrictions applicable to the site; and each applicant for a license amendment approving a license termination plan or decommissioning plan under § 50.82 of this chapter” and add in their place the words “Each applicant for a license amendment approving a license termination plan under § 50.82 of this chapter or § 52.110 of this chapter or a decommissioning plan under § 50.82 of this chapter”.

**§ 51.95 Postconstruction environmental impact statements. [Amended]**

24. In § 51.95, remove the words “of an operating or combined license authorizing decommissioning activities at a production or utilization facility covered by § 51.20,” and add in their place the words “approving a license termination plan under § 50.82 of this chapter or § 52.110 of this chapter or a decommissioning plan under § 50.82 of this chapter”.

**PART 52 – LICENSES, CERTIFICATIONS, AND APPROVALS FOR NUCLEAR  
POWER PLANTS**

25. The authority citation for 10 CFR part 52 is revised to read as follows:

**Authority:** Atomic Energy Act of 1954, secs. 53, 63, 81, 103, 104, 147, 149, 161, 181, 182, 183, 185, 186, 189, 223, 234 (42 U.S.C. 2073, 2093, 2113, 2133, 2134, 2167, 2169, 2201, 2231, 2232, 2233, 2235, 2236, 2239, 2273, 2282); Energy Reorganization Act of 1974, secs. 201, 202, 206, 211 (42 U.S.C. 5841, 5842, 5846, 5851); 44 U.S.C. 3504 note.

26. In § 52.0, revise paragraph (a) to read as follows:

**§ 52.0 Scope; applicability of 10 CFR Chapter I provisions.**

(a) This part governs the issuance of early site permits, standard design certifications, combined licenses, standard design approvals, and manufacturing licenses for nuclear power facilities licensed under Section 103 of the Atomic Energy Act of 1954, as amended (68 Stat. 919), and Title II of the Energy Reorganization Act of 1974 (88 Stat. 1242) through the termination of the associated 10 CFR part 52 licenses. This part also gives notice to all persons who knowingly provide to any holder of or applicant for an approval, certification, permit, or license, or to a contractor, subcontractor, or consultant of any of them, components, equipment, materials, or other goods or services that relate to the activities of a holder of or applicant for an approval, certification, permit, or license, subject to this part, that they may be individually subject to NRC enforcement action for violation of the provisions in 10 CFR 52.4.

\* \* \* \* \*

27. In § 52.3, revise paragraph (b)(9) to read as follows:

**§ 52.3 Written communications.**

\* \* \* \* \*

(b)\*\*\*



(9) *Certification of permanent fuel removal.* The licensee's certification of permanent fuel removal, under § 52.110(a)(1), must state the date of permanent cessation of operations, the date on which the fuel was removed from the reactor vessel, and the disposition of the fuel, and must be submitted to the NRC's Document Control Desk. This submission must be under oath or affirmation.

\* \* \* \* \*

28. In § 52.63, revise paragraph (b)(2) to read as follows:

**§ 52.63 Finality of standard design certifications.**

\* \* \* \* \*

(b)\* \* \*

(2) Subject to § 50.59 of this chapter, a licensee who references a design certification rule may make departures from the design of the nuclear power facility, without prior Commission approval, unless the proposed departure involves a change to the design as described in the rule certifying the design.

(i) The licensee shall maintain records of all departures from the design of the facility and these records must be maintained and available for audit until the date of termination of the license.

(ii) Licensees for which the NRC has docketed the certifications required under § 52.110(a) of this part are not required to retain records of departures from the design of the facility associated with structures, systems, and components that have been permanently removed from service using an NRC-approved change process.

\*\*\*\*\*

**§ 52.109 [Amended]**

29. In § 52.109, remove the words “to authorize ownership and possession of the production or utilization facility,”.

30. In § 52.110, revise paragraphs (b), (d), (f)(2), (h)(1)(i), and (h)(2), add paragraphs (h)(5) through (8), and revise paragraph (i) introductory text and paragraph (i)(2)(vi) to read as follows:

**§ 52.110 Termination of license.**

\* \* \* \* \*

(b)(1) Upon the NRC’s docketing of the licensee’s certifications required under paragraph (a) of this section, or when a final legally effective order to permanently cease operations has come into effect, the 10 CFR part 52 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel.

(2) The facility licensed under this part is no longer a utilization facility once the licensee meets the criteria of paragraph (b)(1) of this section and modifies the facility to be incapable of making use of special nuclear material without significant facility alterations necessary to restore the capability to make use of special nuclear material. The NRC maintains the authority to regulate the 10 CFR part 52 license with respect to the possession of special nuclear material, source material, and byproduct material under sections 53, 63, 81, and 161 of the Act, as applicable. Until the termination of the 10 CFR part 52 license under paragraph (k) of this section, the regulations of this chapter applicable to a utilization facility continue to apply to the holder of the license unless the regulations explicitly state otherwise.

\* \* \* \* \*

(d)(1) Prior to or within 2 years following permanent cessation of operations, the licensee shall submit a post-shutdown decommissioning activities report (PSDAR) to the NRC, and a copy to the affected State(s). The PSDAR must include a description of the planned decommissioning activities along with a schedule for their accomplishment, a discussion that provides whether the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate federally issued environmental review documents, and a site-specific decommissioning cost estimate.

(2) The NRC shall notice in the *Federal Register* the receipt of the PSDAR and the availability for public comment of the PSDAR and the Irradiated Fuel Management Plan required by § 50.54(bb) of this chapter. The NRC shall also schedule a public meeting in the vicinity of the licensee's facility upon receipt of the PSDAR. The NRC shall include a notice in a forum, such as local newspapers, that is readily accessible to individuals in the vicinity of the site, and in the *Federal Register* notice required by this paragraph (d)(2), announcing the date, time and location of the meeting, along with a brief description of the purpose of the meeting.

\* \* \* \* \*

(f)\*\*\*

(2) Result in significant environmental impacts not bounded by appropriate federally issued environmental review documents; or

\* \* \* \* \*

(h)\*\*\*

(1)\*\*\*

(i) The withdrawals are for expenses for activities consistent with the definition of decommissioning in § 52.1 of this part;

\* \* \* \* \*

(2) Initially, 3 percent of the generic amount specified in § 50.75(b) and (c) of this chapter may be used for decommissioning planning. For licensees that have submitted the certifications required under paragraph (a) of this section and commencing 90 days after the NRC has received the PSDAR, an additional 20 percent may be used. A site-specific decommissioning cost estimate must be submitted to the NRC before the licensee may use any funding in excess of these amounts.

\* \* \* \* \*

(5) After submitting its site-specific decommissioning cost estimate required by paragraph (d)(1) of this section, and until the licensee has completed its final radiation survey and demonstrated that residual radioactivity has been reduced to a level that permits termination of its license, the licensee must annually submit to the NRC, by March 31, a financial assurance status report. The report may combine the reporting requirements of § 72.30 of this chapter and § 52.110(h)(7) of this part. The report must include the following information, current through the end of the previous calendar year:

- (i) The amount spent on decommissioning, both cumulative and over the previous calendar year, the remaining balance of any decommissioning funds, and the amount provided by other financial assurance methods being relied upon;
- (ii) An estimate of the costs to complete decommissioning, reflecting any difference between actual and estimated costs for work performed during the year, and the decommissioning criteria upon which the estimate is based;
- (iii) Any modifications occurring to a licensee's current method of providing financial assurance since the last submitted report; and
- (iv) Any material changes to trust agreements or financial assurance contracts.

(6) If the sum of the balance of any remaining decommissioning funds, plus earnings on such funds calculated at not greater than a 2 percent real rate of return, together with the amount provided by other financial assurance methods being relied upon, does not cover the estimated cost to complete the decommissioning, the financial assurance status report must include additional financial assurance to cover the estimated cost of completion.

(7) After submitting its site-specific decommissioning cost estimate required by paragraph (d)(1) of this section, if spent fuel is on site, the licensee must annually submit to the NRC, by March 31, a report on the status of its funding for managing irradiated fuel. The report must include the following information, current through the end of the previous calendar year:

- (i) The amount of funds accumulated to cover the cost of managing the irradiated fuel;
- (ii) The projected cost of managing irradiated fuel until title to the fuel and possession of the fuel is transferred to the Secretary of Energy; and
- (iii) If the funds accumulated do not cover the projected cost, a plan to obtain additional funds to cover the cost.

(8) A licensee may use 10 CFR 50.75 decommissioning trust funds for spent fuel management and 10 CFR part 72 specific license ISFSI decommissioning expenses provided the following conditions are met:

- (i) The NRC has docketed the licensee's certifications required under § 52.110(a) of this part;
- (ii) At least 90 days have passed since the NRC has received the licensee's PSDAR; and
- (iii) The licensee continues to meet § 52.110(h)(1)(ii) and (iii) of this part.

(i) All power reactor licensees that commenced operation must submit an application for termination of license. The application for termination of license must be accompanied or preceded by a license termination plan to be submitted for NRC approval.

(2)\* \* \*

(vi) An updated site-specific estimate of remaining decommissioning costs and identification of sources of funds for license termination, spent fuel management, and ISFSI decommissioning, as applicable;

\* \* \* \* \*

**PART 72 – LICENSING REQUIREMENTS FOR THE INDEPENDENT STORAGE OF SPENT NUCLEAR FUEL, HIGH-LEVEL RADIOACTIVE WASTE, AND REACTOR-RELATED GREATER THAN CLASS C WASTE**

31. The authority citation for 10 CFR part 72 continues to read as follows:

**Authority:** Atomic Energy Act of 1954, secs. 51, 53, 57, 62, 63, 65, 69, 81, 161, 182, 183, 184, 186, 187, 189, 223, 234, 274 (42 U.S.C. 2071, 2073, 2077, 2092, 2093, 2095, 2099, 2111, 2201, 2210e, 2232, 2233, 2234, 2236, 2237, 2238, 2273, 2282, 2021); Energy Reorganization Act of 1974, secs. 201, 202, 206, 211 (42 U.S.C. 5841, 5842, 5846, 5851); National Environmental Policy Act of 1969 (42 U.S.C. 4332); Nuclear Waste Policy Act of 1982, secs. 117(a), 132, 133, 134, 135, 137, 141, 145(g), 148, 218(a) (42 U.S.C. 10137(a), 10152, 10153, 10154, 10155, 10157, 10161, 10165(g), 10168, 10198(a)); 44 U.S.C. 3504 note.

32. In § 72.13, add paragraph (e) to read as follows:

**§ 72.13 Applicability.**

\* \* \* \* \*

(e) The following sections apply to activities associated with a general license, where the licensee has elected to provide for physical protection of the spent fuel in accordance

with § 72.212(b)(9)(vii)(A); § 72.1; § 72.2(a)(1), (b), (c), and (e); §§ 72.3 through 72.6(c)(1); §§ 72.7 through § 72.13(a) and (e); § 72.30(b), (c), (d), (e), and (f); § 72.32(c) and (d); § 72.44(b) and (f); § 72.48; § 72.50(a); § 72.52(a), (b), (d), and (e); § 72.60; § 72.62; §§ 72.72 through 72.80(f); §§ 72.82 through 72.86; §§ 72.104 through 72.106; §§ 72.122 through 72.126; §§ 72.140 through 72.176; §§ 72.180 through 72.186; § 72.190; § 72.194; §§ 72.210 through 72.220; and § 72.240(a).

33. In § 72.30, revise paragraph (b) and (c) introductory text to read as follows:

**§ 72.30 Financial assurance and recordkeeping for decommissioning.**

\* \* \* \* \*

(b)(1) Each applicant for a specific license under this part must submit, as part of its application, a decommissioning funding plan for NRC review and approval.

(2) Each holder of a general license under this part must submit, prior to the initial storage of spent fuel under § 72.212(a)(3) of this part, a decommissioning funding plan for NRC review and approval.

(3) The decommissioning funding plans required by paragraphs (b)(1) and (2) of this section must contain:

(i) Information on how reasonable assurance will be provided that funds will be available to decommission the ISFSI or MRS.

(ii) A detailed cost estimate for decommissioning, in an amount reflecting:

(A) The cost of an independent contractor to perform all decommissioning activities;

(B) An adequate contingency factor; and

(C) The cost of meeting the § 20.1402 of this chapter criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the

provisions of § 20.1403 of this chapter, the cost estimate may be based on meeting the § 20.1403 criteria.

(iii) Identification of and justification for using the key assumptions contained in the decommissioning cost estimate.

(iv) A description of the method of assuring funds for decommissioning from paragraph (e) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility.

(v) The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination.

(vi) A certification that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning.

(c) At the time of license renewal and at intervals not to exceed 3 years, the decommissioning funding plan must be resubmitted with adjustments as necessary to account for changes in costs and the extent of contamination. The decommissioning funding plan must update the information submitted with the original or prior plan and must specifically consider the effect of the following events on decommissioning costs:

\* \* \* \* \*

34. In § 72.32, revise paragraph (a) introductory text and paragraph (c) to read as follows:

**§ 72.32 Emergency Plans.**

\* \* \* \* \*

(a) Each application for an ISFSI that is licensed under this part which is not located on the site or within the exclusion area, as defined in 10 CFR part 100, of a nuclear power



reactor licensed under parts 50 or 52 of this chapter must be accompanied by an Emergency Plan that includes the following information:

\* \* \* \* \*

(c) For an ISFSI that is located on the site or within the exclusion area, as defined in 10 CFR part 100, of a nuclear power reactor licensed under parts 50 or 52 of this chapter, the emergency plan required by 10 CFR 50.47 shall be deemed to satisfy the requirements of this section.

35. In § 72.72, revise paragraph (d) to read as follows:

**§ 72.72 Material balance, inventory, and records requirements for stored materials.**

\* \* \* \* \*

(d)(1) Except as provided in paragraph (d)(2) of this section, records of spent fuel, high-level radioactive waste, and reactor-related GTCC waste containing special nuclear material meeting the requirements in paragraph (a) of this section must be kept in duplicate. The duplicate set of records must be kept at a separate location sufficiently remote from the original records that a single event would not destroy both sets of records.

(2) A single copy of the records described in paragraph (d)(1) of this section may be maintained in a single storage facility provided the facility meets the requirements of an NRC-approved quality assurance program for the storage of records.

(3) Records of spent fuel or reactor-related GTCC waste containing special nuclear material transferred out of an ISFSI or records of spent fuel, high-level radioactive waste, or reactor-related GTCC waste containing special nuclear material transferred out of an MRS must be preserved for a period of five years after the date of transfer.

36. In § 72.212, add paragraph (b)(9)(vii) to read as follows:

**§ 72.212 Conditions of general license issued under § 72.210.**

(b)<sup>\*\*\*</sup>

(9)<sup>\*\*\*</sup>

(vii)(A) Upon NRC docketing of the certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter, and when all spent fuel has been placed in dry cask storage at the facility, the licensee may, as an alternative to the requirements of § 72.212(b)(9)(i) through (vi) of this part, provide for physical protection of the spent fuel under subpart H of this part and § 73.51 of this chapter.

(B) A licensee who elects to provide physical protection under subpart H of this part and § 73.51 of this chapter will submit their physical security plan to the NRC under § 50.54(p) of this chapter.

\* \* \* \* \*

37. Revise § 72.218 to read as follows:

**§ 72.218 Termination of licenses.**

(a) Upon removal of the spent fuel stored under this general license from the reactor site, the licensee must decommission the ISFSI consistent with requirements in § 50.82 of this chapter or § 52.110 of this chapter, as applicable.

(b) The general license under this part is terminated upon termination of the 10 CFR part 50 or 10 CFR part 52 license under § 50.82(a)(11) of this chapter or § 52.110(k) of this chapter, respectively.

## PART 73 – PHYSICAL PROTECTION OF PLANTS AND MATERIALS

38. The authority citation for 10 CFR part 73 continues to read as follows:

**Authority:** Atomic Energy Act of 1954, secs. 53, 147, 149, 161, 170D, 170E, 170H, 170I, 223, 229, 234, 1701 (42 U.S.C. 2073, 2167, 2169, 2201, 2210d, 2210e, 2210h, 2210i, 2273, 2278a, 2282, 2297f); Energy Reorganization Act of 1974, secs. 201, 202 (42 U.S.C. 5841, 5842); Nuclear Waste Policy Act of 1982, secs. 135, 141 (42 U.S.C. 10155, 10161); 44 U.S.C. 3504 note.

Section 73.37(b)(2) also issued under sec. 301, Pub. L. 96-295, 94 Stat. 789 (42 U.S.C. 5841 note).

39. In § 73.51, revise paragraphs (a) introductory text, (a)(1) introductory text, and (a)(2) and add paragraph (a)(3) to read as follows:

### **§ 73.51 Requirements for the physical protection of stored spent nuclear fuel and high-level radioactive waste.**

(a) *Applicability.* Notwithstanding the provisions of § 73.20, § 73.50, or § 73.67 of this part, the physical protection requirements of this section apply to each licensee that stores spent nuclear fuel and high-level radioactive waste:

(1) Under a specific license issued pursuant to part 72 of this chapter:

\* \* \* \* \*

(2) At a geologic repository operations area (GROA) licensed pursuant to part 60 or 63 of this chapter; or

(3) Under a general license issued pursuant to part 72 of this chapter and upon the NRC's docketing of the certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter, when all spent fuel has been placed in dry cask storage at the facility, and notification has been made to the NRC under the provisions of § 72.212(b)(9)(vii) of this chapter.

\* \* \* \* \*

40. In § 73.54, remove the introductory text, revise the introductory text of paragraphs (a), (b), and (c), and add paragraphs (i) and (j) to read as follows:

**§ 73.54 Protection of digital computer and communication systems and networks.**

(a) Each holder of an operating license for a nuclear power reactor under part 50 of this chapter and each holder of a combined license under part 52 of this chapter for which the Commission has made the finding under § 52.103(g) of this chapter shall provide high assurance that its digital computer and communication systems and networks are adequately protected against cyber attacks, up to and including the design basis threat as described in § 73.1 of this part.

\* \* \* \* \*

(b) To accomplish the objectives in paragraph (a) of this section, the licensee shall:

\* \* \* \* \*

(c) The licensee's cyber security program must be designed to:

\* \* \* \* \*

(i) The requirements of this section no longer apply once the following criteria are satisfied:

(1) The NRC has docketed the licensee's certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter; and

(2) At least 10 months (for a boiling water reactor) or at least 16 months (for a pressurized water reactor) have elapsed since the date of permanent cessation of

operations, or an NRC-approved alternative spent fuel decay period, submitted under § 50.54(q)(7)(ii)(A) and (B) of this chapter, has elapsed.

(j) *Removal of cyber security license condition.* The cyber security plan license condition, which requires the licensee to fully implement and maintain in effect all provisions of the Commission-approved cyber security plan including changes made pursuant to the authority of § 50.90 of this chapter and § 50.54(p) of this chapter, is removed from the license once the conditions in paragraph (i) of this section are satisfied.

41. In § 73.55:

- a. Revise paragraph (b)(3) introductory text;
- b. Add paragraphs (b)(9)(ii)(B)(1) and (2);
- c. Revise paragraphs (c)(6), (e)(9)(v)(A), (j)(4)(ii), and (p)(1)(i) and (ii).

The revisions and additions read as follows:

**§ 73.55 Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage.**

\* \* \* \* \*

(b)\*\*\*

(3) The physical protection program must be designed to prevent significant core damage until the NRC has docketed the certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter. The physical protection program must also be designed to prevent spent fuel sabotage. Specifically, the program must:

\* \* \* \* \*

(9)\*\*\*

(ii)\*\*\*

(B)\*\*\*

(1) Licensees who are implementing 10 CFR part 26, regardless of whether they are required to do so, are in compliance with paragraph (b)(9)(ii)(B) of this section.

(2) Licensees, upon the NRC's docketing of their certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter, will be in compliance with paragraph (b)(9)(ii)(B) of this section by implementing the following:

(i) A fitness for duty program in which individuals who maintain unescorted access authorization and have unescorted access to a vital area, individuals who perform the duties under § 26.4(a)(5) of this chapter, and individuals who perform duties under § 26.4(g) of this chapter, are subject to the requirements in 10 CFR part 26 except for subparts I and K; and

(ii) A fitness for duty program in which those individuals who are not included in paragraph (b)(9)(ii)(B)(2)(i) of this section, maintain unescorted access authorization, and have unescorted access to the protected area are subject to the requirements of §§ 26.31(c)(1) and (2) and 26.33 of this chapter.

\* \* \* \* \*

(c)\*\*\*

(6) Cyber Security Plan. The licensee shall establish, maintain, and implement a Cyber Security Plan in accordance with the requirements of § 73.54 of this part. The licensee no longer needs to maintain and implement its Cyber Security Plan once the criteria in § 73.54(i) of this part have been satisfied.

\* \* \* \* \*

(e)\*\*\*

(g)\*\*\*

(v)<sup>\*\*\*</sup>

(A) The reactor control room, unless the licensee has submitted and the NRC has docketed the certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter, and the licensee has documented that all vital equipment has been removed from the control room and the control room does not serve as the vital area boundary for other vital areas;

\* \* \* \* \*

(j)<sup>\*\*\*</sup>

(4)<sup>\*\*\*</sup>

(ii) A system for communication with the control room, or, if the NRC has docketed the certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter, a system for communication with the certified fuel handler or the senior on-shift licensee representative responsible for overall safety and security of the permanently shutdown and defueled facility.

\* \* \* \* \*

(p)<sup>\*\*\*</sup>

(1)<sup>\*\*\*</sup>

(i) In accordance with § 50.54(x) and (y) of this chapter, the licensee may suspend any security measures under this section in an emergency when this action is immediately needed to protect the public health and safety and no action consistent with license conditions and technical specifications that can provide adequate or equivalent protection is immediately apparent. This suspension of security measures must be approved as a minimum by a licensed senior operator, or, if the certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter have been docketed by

the NRC, by either a licensed senior operator or a certified fuel handler, before taking this action.

(ii) During severe weather when the suspension of affected security measures is immediately needed to protect the personal health and safety of security force personnel and no other immediately apparent action consistent with the license conditions and technical specifications can provide adequate or equivalent protection. This suspension of security measures must be approved, as a minimum, by a licensed senior operator, or, if the certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter have been docketed by the NRC, by either a licensed senior operator or a certified fuel handler, with input from the security supervisor or manager, before taking this action.

\* \* \* \* \*

## **PART 140 – FINANCIAL PROTECTION REQUIREMENTS AND INDEMNITY AGREEMENTS**

42. The authority citation for 10 CFR part 140 continues to read as follows:

**Authority:** Atomic Energy Act of 1954, secs. 161, 170, 223, 234 (42 U.S.C. 2201, 2210, 2273, 2282); Energy Reorganization Act of 1974, secs. 201, 202 (42 U.S.C. 5841, 5842); 44 U.S.C. 3504 note.

43. In § 140.11, add paragraph (a)(5), redesignate paragraph (b) as paragraph (c), revise newly redesignated paragraph (c), and add new paragraph (b) to read as follows:

### **§ 140.11 Amounts of financial protection for certain reactors.**



(a)<sup>\*\*\*</sup>

(5) In the amount of at least \$100,000,000, for each nuclear reactor:

(i) For which the NRC has docketed the certifications required under § 50.82(a)(1) of this chapter or § 52.110(a) of this chapter, and

(ii) For which at least 10 months (for a boiling water reactor) or 16 months (for a pressurized water reactor) have elapsed since the date of permanent cessation of operations, or for which an NRC-approved alternative to the 10 or 16 month spent fuel decay period, submitted under § 50.54(q)(7)(ii)(A) and (B) of this chapter, has elapsed.

(b) Secondary financial protection (in the form of private liability insurance available under an industry retrospective rating plan providing for deferred premium charges) will no longer be required once the criteria in § 140.11(a)(5)(i) and (ii) of this part have been met.

(c) In any case where two or more nuclear reactors at the same location are licensed under parts 50, 52, or 54 of this chapter, the total financial protection required of the licensee for all such reactors (excluding any applicable secondary financial protection) is the highest amount which would otherwise be required for any one of those reactors; provided, that such financial protection covers all reactors at the location.

44. In § 140.81, revise paragraph (a) to read as follows:

**§ 140.81 Scope and purpose.**

(a) *Scope.* This subpart applies to applicants for and holders of operating licenses issued under part 50 of this chapter, combined licenses issued under part 52 of this chapter, or renewed licenses issued under part 54 of this chapter, authorizing operation of production facilities and utilization facilities, and to other persons indemnified with

respect to such facilities. This subpart shall cease to apply to licensees under part 50, part 52, and part 54 of this chapter once the licensee satisfies the criteria in § 140.11(a)(5)(i) and (ii) of this part.

\* \* \* \* \*

Dated at Rockville, Maryland, this      day of      , 2018.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,  
Secretary of the Commission.

**FRN: REGULATORY IMPROVEMENTS FOR PRODUCTION AND UTILIZATION FACILITIES TRANSITIONING TO DECOMMISSIONING [ENTER DATE HERE]**

**ADAMS Accession Number: PKG: ML18012A019; FRN: ML18012A022. WITS: SRM-S14-0118-3 \* via e-mail**

OFFICE	NMSS/DRM/RRPB/PM*	NMSS/DRM/RRPB/RS*	NMSS/DRM/RRPB/BC	NMSS/DRM/D
NAME	DDoyle	GLappert	MKhanna	PHolahan
DATE	2/7/2018	2/6/2018	1/31/2018	2/21/2018 (w/comments)
OFFICE	RES/DE/D*	OCIO/GEMSD/ISB/ICT*	RES/D*	OE/D*
NAME	BThomas	DCullison	MWeber	ABoland
DATE	2/13/2018	3/2/2018	3/6/2018	3/2/2018
OFFICE	NSIR/D*	NMSS/D*	NRO/D*	OGC*
NAME	BMcDermott (JLubinski for)	MDapas (JTappert for)	FBrown	HBenowitz (NLO)
DATE	3/8/2018	3/11/2018	3/8/2018	4/20/2018
OFFICE	NMSS/DRM/RASB/BC*	NRR/D	EDO	
NAME	CBladey	BHolian (MEvans for)	VMcCree (MJohnson for)	
DATE	4/10/2018	4/19/2018	5/ 7 /2018	

OFFICIAL RECORD COPY

| [SGB Edits](#)

# **Regulatory Analysis for the Proposed Rule: Regulatory Improvements for Production and Utilization Facilities Transitioning to Decommissioning**

NRC-2015-0070; RIN 3150-AJ59

---

**U.S. Nuclear Regulatory Commission**

**May 2018**



U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
ADAMS Accession No. ML18012A024

---

## CONTENTS

List of Figures .....	vi
List of Tables .....	ix
Abbreviations and Acronyms.....	x
Executive Summary .....	1
1 INTRODUCTION.....	2
1.1 Background.....	3
1.2 Statement of the Problem.....	5
1.3 Objectives .....	5
1.4 Sections in the Proposed Rulemaking.....	6
2 DECOMMISSIONING INPUTS.....	6
2.1 Decommissioning Levels.....	6
2.1.1 Level 1 .....	6
2.1.2 Level 2 .....	7
2.1.3 Level 3 .....	7
2.1.4 Level 4 .....	7
2.2 Decommissioning Experience of Recent Plants .....	7
3 Identification of affected attributes .....	8
4 IDENTIFICATION AND ANALYSIS OF ALTERNATIVES FOR THE DECOMMISSIONING AREAS.....	9
4.1 Emergency Preparedness .....	9
4.1.1 Alternative EP-1 (No-action alternative).....	11
4.1.2 Alternative EP-2 (Rulemaking to amend regulations to provide a graded approach to emergency preparedness / emergency plan changes between levels with NRC approval).....	12
4.1.3 Assumptions.....	23
4.1.4 Affected Attributes.....	23
4.2 Physical Security.....	24
4.2.1 Alternative PS-1 (No-action alternative).....	25
4.2.2 Alternative PS-2 (Rulemaking) .....	25
4.2.3 Assumptions.....	28
4.2.4 Affected Attributes.....	28
4.3 Cyber Security.....	29
4.3.1 Alternative CS-1 (No-action alternative) .....	29
4.3.2 Alternative CS-2 (Rulemaking to remove all cyber security requirements when spent fuel has sufficiently decayed) .....	29
4.3.3 Assumptions.....	30
4.3.4 Affected Attributes.....	30
4.4 Drug and Alcohol Testing .....	31
4.4.1 Alternative DA-1 (No-action alternative) .....	31
4.4.2 Alternative DA-2 (Rulemaking to require Fitness for Duty program elements that support IMP for power reactors).....	32
4.4.3 Assumptions.....	32
4.4.4 Affected Attributes.....	33
4.5 Certified Fuel Handler Definition and Elimination of Shift Technical Advisor.....	33
4.5.1 Alternative CFH/STA-1 (No-action alternative) .....	34
4.5.2 Alternative CFH/STA-2 (Rulemaking regarding CFH definition and Shift Technical Advisor).....	34
4.5.3 Assumptions.....	35
4.5.4 Affected Attributes.....	35

---

4.6	Decommissioning Funding Assurance .....	36
4.6.1	Alternative DTF-1 (No-action alternative) .....	37
4.6.2	Alternative DTF-2 (Rulemaking to amend regulations to minimize exemptions and reduce the ambiguity in the decommissioning trust fund regulations) .....	37
4.6.3	Assumptions.....	38
4.6.4	Affected Attributes.....	39
4.7	Offsite and Onsite Financial Protection Requirements and Indemnity Agreements.....	39
4.7.1	Alternative FP-1 (No-action alternative).....	40
4.7.2	Alternative FP-2 (Rulemaking to codify the current exemption process) .....	41
4.7.3	Assumptions.....	43
4.7.4	Affected Attributes.....	43
4.8	Environmental Considerations.....	44
4.8.1	Alternative ENV-1 (No Action).....	44
4.8.2	Alternative ENV-2 (Rulemaking).....	44
4.8.3	Assumptions.....	45
4.8.4	Affected Attributes.....	45
4.9	Record Retention Requirements .....	45
4.9.1	Alternative R-1 (No-Action).....	46
4.9.2	Alternative R-2 (Rulemaking to Decrease Record Retention Requirements during Decommissioning) .....	46
4.9.3	Assumptions.....	47
4.9.4	Affected Attributes.....	47
4.10	Low-Level Waste Transportation.....	47
4.10.1	Alternative TR-1 (No-Action) .....	48
4.10.2	Alternative TR-2 (Rulemaking to Change Low Level Waste Transportation Requirements).....	48
4.10.3	Assumptions.....	48
4.10.4	Affected Attributes.....	48
4.11	Spent Fuel Management Planning .....	49
4.11.1	Alternative SFM-1 (No-Action).....	49
4.11.2	Alternative SFM-2 (Rulemaking to clarify and update Spent Fuel Management Planning) .....	49
4.11.3	Assumptions.....	50
4.11.4	Affected Attributes.....	50
4.12	Backfit Rule.....	50
4.12.1	Alternative B-1 (No-action alternative).....	52
4.12.2	Alternative B-2 (Conduct rulemaking to clarify how the NRC applies the Backfit Rule to licensees in decommissioning) .....	53
4.12.3	Affected Attributes.....	53
4.13	Foreign Ownership, Control, or Domination (FOCD) .....	53
4.13.1	Alternative F-1 (No Action) .....	53
4.13.2	Alternative F-2 (Rulemaking to specify FOCD).....	54
4.13.3	Assumptions.....	55
4.13.4	Affected Attributes.....	55
4.14	Clarification of Scope of License Termination Plan Requirement.....	55
4.14.1	Alternative T-1 (No-Action) .....	55
4.14.2	Alternative T-2 (Rulemaking to clarify license termination plan).....	56
4.14.3	Assumptions.....	56

---

---

5	EVALUATION OF COSTS AND BENEFITS FOR AREAS OF DECOMMISSIONING CONSIDERED FOR RULEMAKING.....	56
5.1	Analytical Methodology .....	56
5.1.1	Regulatory Baseline .....	57
5.1.2	Discount Rates.....	57
5.1.3	Cost/Benefit Inflaters .....	57
5.1.4	Labor Rates.....	58
5.1.5	Affected Entities .....	58
5.1.6	Sign Conventions .....	60
5.1.7	Base Year .....	60
5.1.8	Time Period of Analysis.....	60
5.1.9	Cost Estimation .....	60
6	PRESENTATION OF RESULTS FOR AREAS OF DECOMMISSIONING CONSIDERED FOR RULEMAKING.....	61
6.1	Industry Implementation .....	61
6.1.1	Averted Industry Implementation Costs .....	62
6.1.2	Additional Industry Implementation Costs.....	63
6.2	Industry Operation.....	64
6.2.1	Averted and Additional Industry Recurring Costs .....	65
6.3	NRC Implementation .....	65
6.3.1	Averted NRC Implementation Costs.....	66
6.3.2	Additional NRC Implementation Costs.....	66
6.4	NRC Operation.....	67
6.5	Regulatory Efficiency.....	68
6.6	Other Government .....	68
6.7	General Public.....	69
6.8	Environmental Considerations.....	69
6.9	Disaggregation .....	69
6.10	Uncertainty Analysis.....	70
6.10.1	Emergency Preparedness .....	71
6.10.2	Physical Security.....	74
6.10.3	Cyber Security.....	76
6.10.4	Drug and Alcohol Testing .....	78
6.10.5	Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor .....	80
6.10.6	Decommissioning Funding Assurance.....	82
6.10.7	Offsite and Onsite Financial Protection Requirements and Indemnity Agreements.....	84
6.10.8	Environmental Considerations.....	86
6.10.9	Record Retention Requirements .....	88
6.10.10	Low-Level Waste Transportation .....	90
6.10.11	Spent Fuel Management Planning .....	92
6.10.12	Backfit Rule .....	94
6.10.13	Foreign Ownership, Control, or Domination (FOCD) .....	96
6.11	Summary.....	98
6.11.1	Quantified Net Benefit .....	98
6.11.2	Qualitative Costs and Benefits .....	99
6.12	Safety Goal Evaluation.....	100
7	DECISION RATIONALE FOR THE AREAS OF DECOMMISSIONING .....	101
7.1	Emergency Preparedness.....	104
7.2	Physical Security .....	104

---

---

7.3	Cyber Security.....	104
7.4	Drug and Alcohol Testing.....	104
7.5	Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor .....	105
7.6	Decommissioning Funding Assurance .....	105
7.7	Offsite and Onsite Financial Protection Requirements and Indemnity Agreements.....	105
7.8	Environmental Considerations.....	106
7.9	Record Retention Requirements .....	106
7.10	Low-Level Waste Transportation .....	106
7.11	Spent Fuel Management Planning .....	107
7.12	Backfit Rule.....	107
7.13	Foreign Ownership, Control, or Domination (FOCD) .....	107
7.14	Clarification of Scope of License Termination Plan Requirement.....	108
8	NRC PROPOSED RULE.....	108
9	GUIDANCE DOCUMENTS .....	109
	REFERENCES .....	111
	APPENDIX A: INDUSTRY LABOR RATES.....	A-1
	APPENDIX B: UNCERTAINTY ANALYSIS VARIABLES .....	B-1



---

## LIST OF FIGURES

Figure 1	Variation of industry cost due to the uncertainty in the Emergency Preparedness cost drivers (Alternative EP-2).....	71
Figure 2	Variation of NRC cost due to the uncertainty in the Emergency Preparedness cost drivers (Alternative EP-2) .....	72
Figure 3	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Emergency Preparedness cost drivers (Alternative EP-2) .....	72
Figure 4	Tornado chart showing the variation of total cost due to each Emergency Preparedness cost driver (Alternative EP-2).....	73
Figure 5	Variation of industry cost due to the uncertainty in the Physical Security cost drivers (Alternative PS-2) .....	74
Figure 6	Variation of NRC cost due to the uncertainty in the Physical Security cost drivers (Alternative PS-2) .....	74
Figure 7	Variation of total cost industry, NRC, State and local governments and general public) due to the uncertainty in the Physical Security cost drivers (Alternative PS-2) .....	75
Figure 8	Tornado chart showing the variation of total cost due to each Physical Security cost driver (Alternative PS-2) .....	75
Figure 9	Variation of industry cost due to the uncertainty in the cyber security cost drivers (Alternative CS-2).....	76
Figure 10	Variation of NRC cost due to the uncertainty in the cyber security cost drivers (Alternative CS-2).....	76
Figure 11	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cyber security cost drivers (Alternative CS-2).....	77
Figure 12	Tornado chart showing the variation of total cost due to each cyber security cost driver (Alternative CS-2) .....	77
Figure 13	Variation of industry cost due to the uncertainty in the Drug and Alcohol Testing cost drivers (Alternative DA-2) .....	78
Figure 14	Variation of NRC cost due to the uncertainty in the Drug and Alcohol Testing cost drivers (Alternative DA-2) .....	78
Figure 15	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Drug and Alcohol Testing cost drivers (Alternative DA-2).....	79
Figure 16	Tornado chart showing the variation of total cost due to each Drug and Alcohol Testing cost driver (Alternative DA-2).....	79
Figure 17	Variation of industry cost due to the uncertainty in the Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor cost drivers (Alternative CFH/STA-2).....	80

---

Figure 18	Variation of NRC cost due to the uncertainty in the Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor cost drivers (Alternative CFH/STA-2).....	80
Figure 19	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor cost drivers (Alternative CFH/STA-2).....	81
Figure 20	Tornado chart showing the variation of total cost due to each Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor cost driver (Alternative CFH/STA-2).....	81
Figure 21	Variation of industry cost due to the uncertainty in the Decommissioning Funding Assurance cost drivers (Alternative DTF-2) .....	82
Figure 22	Variation of NRC cost due to the uncertainty in the Decommissioning Funding Assurance cost drivers (Alternative DTF-2) .....	82
Figure 23	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Decommissioning Funding Assurance cost drivers (Alternative DTF-2) .....	83
Figure 24	Tornado chart showing the variation of total cost due to each Decommissioning Funding Assurance cost driver (Alternative DTF-2) .....	83
Figure 25	Variation of industry cost due to the uncertainty in the Financial Protection cost drivers (Alternative FP-2).....	84
Figure 26	Variation of NRC cost due to the uncertainty in the Financial Protection cost drivers (Alternative FP-2) .....	84
Figure 27	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Financial Protection cost drivers (Alternative FP-2) .....	85
Figure 28	Tornado Chart showing the variation of total cost due to each Financial Protection cost driver (Alternative FP-2).....	85
Figure 29	Variation of industry cost due to the uncertainty in the cost input variables (Alternative ENV-2) .....	86
Figure 30	Variation of NRC cost due to the uncertainty in the cost input variables (Alternative ENV-2) .....	86
Figure 31	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cost input variables (Alternative ENV-2) .....	87
Figure 32	Tornado chart showing the variation of total cost due to each cost driver (Alternative ENV-2) .....	87
Figure 33	Variation of industry cost due to the uncertainty in the cost input variables (Alternative R-2) .....	88
Figure 34	Variation of NRC cost due to the uncertainty in the cost input variables (Alternative R-2) .....	88
Figure 35	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cost input variables (Alternative R-2) .....	89

---

---

Figure 36	Tornado chart showing the variation of total cost due to each cost driver (Alternative R-2) .....	89
Figure 37	Variation of industry cost due to the uncertainty in the cost input variables (Alternative TR-2) .....	90
Figure 38	Variation of NRC cost due to the uncertainty in the cost input variables (Alternative TR-2) .....	90
Figure 39	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cost input variables (Alternative TR-2) .....	91
Figure 40	Tornado chart showing the variation of total cost due to each cost driver (Alternative TR-2) .....	91
Figure 41	Variation of industry cost due to the uncertainty in the cost Input variables (Alternative SFM-2) .....	92
Figure 42	Variation of NRC cost due to the uncertainty in the cost input variables (Alternative SFM-2) .....	92
Figure 43	Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cost input variables (Alternative SFM-2) .....	93
Figure 44	Tornado chart showing the variation of total cost due to each cost driver (Alternative SFM-2) .....	93
Figure 45	Variation of industry cost due to the uncertainty in the Backfit Rule cost drivers (Alternative B-2) .....	94
Figure 46	Variation of NRC cost due to the uncertainty in the Backfit Rule cost drivers (Alternative B-2) .....	94
Figure 47	Variation of total cost due to the uncertainty in the Backfit Rule cost drivers (Alternative B-2) .....	95
Figure 48	Tornado Chart showing the variation of total cost due to each Backfit Rule cost driver (Alternative B-2) .....	95
Figure 49	Variation of industry cost due to the uncertainty in the FOCD cost drivers (Alternative F-2) .....	96
Figure 50	Variation of NRC cost due to the uncertainty in the FOCD cost drivers (Alternative F-2) .....	97
Figure 51	Variation of total cost due to the uncertainty in the FOCD cost drivers (Alternative F-2) .....	97
Figure 52	Tornado Chart showing the variation of total cost due to each FOCD cost driver (Alternative F-2) .....	98

---

## LIST OF TABLES

Table 1	Decommissioning Areas under Proposed Rulemaking .....	2
Table 2	Licensing Activity Summary for Recent Permanently Shutdown Reactors .....	8
Table 3	Licensing Actions Summary for Recent Permanently Shutdown Reactors .....	8
Table 4	Two-Step Graded Approach.....	41
Table 5	Consumer Price Index—All Urban Consumers, U.S. City Average.....	58
Table 6	Averted Industry Implementation Costs.....	63
Table 7	Additional Industry Implementation Costs.....	64
Table 8	Averted Industry Operation Costs.....	65
Table 9	Averted NRC Implementation Costs.....	66
Table 10	Additional NRC Implementation Costs.....	67
Table 11	Averted NRC Operation Costs.....	67
Table 12	Costs to Other Government.....	68
Table 13	Costs to the General Public.....	69
Table 14	Total Net Benefits and Costs for Industry .....	99
Table 15	Total Net Benefits and Costs for NRC .....	99
Table 16	Summary of Totals for the Recommended Alternatives.....	108

---

## ABBREVIATIONS AND ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AEA	Atomic Energy Act of 1954, as amended
AMP	aging management program
ANPR	advance notice of proposed rulemaking
BLS	Bureau of Labor Statistics
BWR	boiling-water reactor
CFH	certified fuel handler
CFR	<i>Code of Federal Regulations</i>
COL	combined license
CPI-U	Consumer Price Index for all urban consumers
CSP	cyber security plan
DBA	design-basis accident
DBT	design-basis threat
DCE	decommissioning cost estimate
DCSS	dry cask storage system
DOE	U.S. Department of Energy
DP	decommissioning plan
DTF	decommissioning trust fund
EA	environmental assessment
EAL	emergency action level
ECL	emergency classification level
EIS	environmental impact statement
EOS	Emergency Operations Facility
EP	emergency preparedness
EPA	U.S. Environmental Protection Agency
EPZ	emergency planning zones
ERDS	Emergency Response Data System
ERO	Emergency Response Organization
ETE	evacuation time estimate
FEMA	Federal Emergency Management Agency
FFD	fitness for duty
FR	<i>Federal Register</i>
FTE	full-time equivalent
GEIS	Generic Environmental Impact Statement
GL	generic letter

---

HAB	hostile action-based
IFMP	Irradiated Fuel Management Plan
IMP	insider mitigation program
IOEP	independent spent fuel storage installation-only emergency plan
IP	inspection plan
ISFSI	independent spent fuel storage installation
IT	information technology
LAR	license amendment request
LLW	Low-Level Radioactive Wastes
LTP	License Termination Plan
MOU	memorandum of understanding
NAICS	North American Industry Classification System
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NLO	Non-Licensed Operator
NOUE	notification of unusual event
NPP	nuclear power plant
NPV	net present value
NRC	Nuclear Regulatory Commission
NUREG	NRC technical report
OMB	Office of Management and Budget
ORO	Offsite Response Organization
PA	Protected Area
PAA	Price-Anderson Act
PAGS	protective action guides
PAR	protective action recommendation
PDEP	permanently defueled emergency plan
PERT	program evaluation and review technique
PS	physical security
PSDAR	Post-Shutdown Decommissioning Activities Report
PSEP	Post-Shutdown Emergency Plan
PWR	pressurized-water reactor
QAP	Quality Assurance Program
RAI	Request for Additional Information
RB	Regulatory Basis
RCS	reactor coolant system

---

---

REP	radiological emergency preparedness
RG	regulatory guide
SAE	site area emergency
SSC	structures, systems, and components
SSCE	site-specific cost estimate
SER	safety evaluation report
SFP	spent fuel pool
SNF	spent nuclear fuel
SOC	standard occupational classification (code)
SRM	staff requirements memorandum
STA	shift technical advisor
TSC	Technical Support Center
UA	Unescorted Access
UAA	Unescorted Access Authorization
VA	Vital Area

---

## EXECUTIVE SUMMARY

The NRC is proposing to amend its regulations related to the decommissioning of production and utilization facilities. The Commission directed the NRC staff to proceed with an integrated rulemaking on power reactor decommissioning to address: a graded approach to emergency preparedness (EP); lessons learned from the plants that have already gone through (or are currently going through) the decommissioning process; the advisability of requiring a licensee's post-shutdown decommissioning activities report (PSDAR) to be approved by the NRC; maintaining the three existing options for decommissioning and the associated timeframes; the role of State and local governments and non-governmental stakeholders in the decommissioning process; and any other issues deemed relevant by the NRC staff.

Major provisions of the proposed rule include changes in the areas of: emergency preparedness, physical security, cyber security, drug and alcohol testing, certified fuel handler training, decommissioning funding assurance, offsite and onsite financial protection requirements and indemnity agreements, environmental considerations, records retention requirements, low-level waste transportation time, spent fuel management planning, NRC's backfit rule, foreign ownership, control, or domination, and scope of the license termination plan requirement.

In this regulatory analysis, the NRC presents the costs, benefits and other impacts to industry, government and society from the proposed rule. The regulatory analysis evaluated the economic impact of the proposed changes to the above areas of decommissioning and concludes that the proposed rule should be adopted because it would result in a cost benefit to the nuclear power industry, government, and society as summarized in [Table 1](#) below.



Table 1 Decommissioning Areas under Proposed Rulemaking

Area of Decommissioning	Proposed Alternative	Total Net Benefit (Cost) <sup>a,b</sup> (2018 million dollars, 7% NPV <sup>c</sup> )
Emergency Preparedness	EP-2	\$7.74
Physical Security	PS-2	\$0.88
Cyber Security	CS-2	\$0.08
Drug and Alcohol Testing	DA-2	\$7.02
Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor	CFH/STA-2	\$0.37
Decommissioning Funding Assurance	DTF-2	\$2.06
Offsite and Onsite Financial Protection	FP-2	\$0.56
Environmental Considerations	ENV-2	(\$0.04)
Record Retention Requirements	R-2	\$0.24
Low-Level Waste Transportation Time	TR-2	\$0.16
Spent Fuel Management Planning	SFM-2	(\$0.30)
Backfit Rule	BF-2	(\$0.06)
Foreign Ownership, Control, or Domination	F-2	\$0.08
Total:		\$18.80

<sup>a</sup> These estimates are based on preliminary inputs and are subject to change.

<sup>b</sup> The total net benefit results are sensitive to the timing of when costs and benefits occur and to the discount rate for these decommissioning areas.

<sup>c</sup> NPV is defined as net present value.

## 1 INTRODUCTION

This document presents the regulatory analysis for the proposed rule, “Regulatory Improvements for Production and Utilization Facilities Transitioning to Decommissioning.” The NRC last amended its requirements for the decommissioning of nuclear power plants in 1996. Staff proposed improvements to the decommissioning requirements in 1999, but after the terrorist attacks of September 11, 2001, the NRC discontinued work on the decommissioning rulemaking and redirected resources toward higher priority work related to safeguards and security. Because no reactors were planning to shut down at that time, the NRC decided there was no immediate need to complete the rulemaking. However in 2013, four power reactor units permanently shut down and defueled without significant advance notice or preplanning. These licensees and the associated shutdown reactors were: Duke Energy Florida for Crystal River Unit 3 Nuclear Generation Plant; Dominion Energy Kewaunee for Kewaunee Power Station; and Southern California Edison for San Onofre Nuclear Generating Station, Units 2 and 3. On December 29, 2014, Entergy Nuclear Operations, Inc., shut down Vermont Yankee Nuclear Power Station (Vermont Yankee), and on January 12, 2015, the licensee certified that Vermont Yankee had permanently ceased operation and removed fuel from the reactor vessel. In addition, the Omaha Public Power District board of directors shut down Fort Calhoun Station on October 24, 2016. Furthermore as of the time of this writing, the following operating nuclear power stations have announced plans to permanently shut down between 2018 and 2025: Oyster Creek Nuclear Generating Station plans to shut down by October 31, 2018; Pilgrim Nuclear Power Station plans to shut down by June 1, 2019; Three Mile Island Nuclear Station, Unit 1 is planning to shut down on or about September 30, 2019; Davis-Besse Nuclear Power Station, Unit 1 plans to shut down by May 31, 2020; Indian Point Nuclear Generating, Units 2 and 3 plans to shut down by April 30, 2021; Perry Nuclear Power Plant, Unit 1 plans to shut

---

down by May 31, 2021; Beaver Valley Power Station, Units 1 and 2 plans to shut down by October 31, 2021; Palisades Nuclear Plant plans to shut down by spring of 2022; and Diablo Canyon Power Plant, Units 1 and 2 plans to shut down ~~in~~by 2025.

Both the decommissioning reactor licensees and the NRC expended substantial resources processing licensing actions for these power reactors during their transition period to a decommissioning status. These licensing actions come in the form of exemptions and amendments to reduce requirements no longer needed to protect public health and safety and the common defense and security for permanently shutdown reactors. To date, the NRC has not identified any safety or security concerns in the current regulatory framework for decommissioning power reactors. However, insights from the recent licensing activities associated with decommissioning power reactors indicate that the decommissioning process can be improved to be more efficient, predictable, and less costly by reducing the processing of individual licensing actions and revising the NRC regulations to achieve a long-term regulatory framework for decommissioning. Therefore, the NRC's goal is to take the appropriate approach for making regulatory changes that reduce the number of licensing actions needed during decommissioning, while still ensuring safety. Furthermore, as stated previously, the staff, consistent with Commission direction, has considered, as part of this rulemaking effort, other issues deemed relevant to decommissioning.

## 1.1 Background

Detailed regulations for the decommissioning of nuclear power reactors were not included in the NRC rules before 1988. In that year, the NRC published a final rule in the *Federal Register* (FR) (Ref. 1), establishing decommissioning requirements for various types of licensees (53 FR 24018). By the early 1990s, the NRC recognized a need for more changes to the power reactor decommissioning regulations and published a proposed rule to amend its regulations for reactor decommissioning in 1995 (Ref. 2). In 1996, the NRC amended its regulations for reactor decommissioning to clarify ambiguities, make generically applicable procedures being used on a case-by-case basis, and allow for greater public participation in the decommissioning process (Ref. 3). However, as an increasing number of power reactor licensees began decommissioning their reactors in the 1990s, it became apparent that the NRC should consider conducting rulemaking on specific topics in order to improve the efficiency and effectiveness of the decommissioning process.

In a series of Commission papers issued between 1997 and 2001, the NRC staff provided options and recommendations to the Commission to address regulatory improvements related to power reactor decommissioning. In the staff requirements memorandum (SRM) to SECY-99-168, "Improving Decommissioning Regulations for Nuclear Power Plants" (Ref. 4), the Commission directed the NRC staff to proceed with a single, integrated, risk-informed decommissioning rule, addressing the areas of EP, insurance, safeguards, staffing and training, and backfitting. The objective of this rulemaking was to clarify and remove certain regulations for decommissioning power reactors as informed by the reduction in radiological risk to public health and safety and the common defense and security compared to the radiological risk of operating reactors.

During reactor decommissioning, the principal safety concern is the storage of spent fuel in the spent fuel pool (SFP) or an independent spent fuel storage installation (ISFSI). Based on NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants" (Ref. 5), the only accident that might lead to a significant radiological release at a decommissioning reactor is a zirconium fire from an SFP accident, within a few months after the

---

reactor has been permanently shut down. The zirconium fire scenario is a postulated, but highly unlikely, beyond-design-basis accident that involves a major loss of water inventory from the SFP, resulting in a significant heatup of the spent fuel, thus leading to substantial zirconium cladding oxidation and fuel damage. The analyses of spent fuel heatup scenarios that might result in a zirconium fire take into consideration the decay heat of the irradiated fuel stored in the SFP and the exothermic reactions of the zirconium with oxygen, water, or both. Therefore, the probability of a zirconium fire scenario continues to decrease as a function of the time that the decommissioning reactor has been permanently shut down. With the permanent cessation of reactor operations and the permanent removal of the fuel from the reactor core, the risk of an accident at decommissioning plants and the number of events that can have significant offsite consequences are significantly reduced. As a result of the shutdown and removal of fuel from the reactor vessel, the reactor, reactor coolant system, and supporting systems no longer operate and, therefore, have no function. Hence, postulated accidents involving failure or malfunction of the reactor, reactor coolant system, or supporting systems are no longer applicable for a power reactor that has decommissioned.

On June 28, 2000, the NRC submitted SECY-00-0145 (Ref. 6) to the Commission, proposing an integrated decommissioning rulemaking plan that would amend regulations in the areas of emergency preparedness, insurance, safeguards, staffing and training, and backfitting for licensees who certified, pursuant to Title 10 of the *Code of Federal Regulations* (CFR) section 50.82(a) that they permanently ceased facility operation(s) and permanently removed fuel from the reactor vessel. The rulemaking plan was contingent on the completion of a zirconium fire risk study provided in NUREG-1738. NUREG-1738 could not completely rule out the possibility of a zirconium fire after extended spent fuel decay times. However, NUREG-1738 did demonstrate that storage of spent fuel in a high-density configuration in SFPs is safe, and that the risk of accidental release of a significant amount of radioactive material to the environment is extremely low.

Because of uncertainty in the NUREG-1738 conclusions about the risk of SFP fires, the NRC faced a challenge in developing a generic decommissioning rule for EP, physical security, and insurance. To seek additional Commission direction, on June 4, 2001, the NRC submitted to the Commission SECY-01-0100, "Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools" (Ref. 7). However, given the zirconium fire risk study in NUREG-1738 that showed the risk of a SFP fire to be extremely low, and the reactor security implications of the terrorist attacks of September 11, 2001, the NRC redirected its rulemaking priorities to focus on programmatic regulatory changes related to safeguards and security.

In the SRM for SECY-14-0118, "Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements," dated December 30, 2014 (Ref. 8), the Commission directed the NRC to proceed with rulemaking on reactor decommissioning and set an objective of early 2019 for its completion. The Commission also stated that this rulemaking should address the following:

- Issues discussed in SECY-00-0145 such as the graded approach to EP.
- Lessons learned from the plants that have already (or are currently) going through the decommissioning process.
- The advisability of requiring a licensee's PSDAR to be approved by the NRC.
- Maintaining the three existing decommissioning options and the associated timeframes.
- The role of State and local governments and non-governmental stakeholders in the decommissioning process.

- 
- Any other issues deemed relevant by the NRC staff.

In SECY-15-0014, “Anticipated Schedule and Estimated Resources for a Power Reactor Decommissioning Rulemaking,” (Ref. 9), the NRC committed to proceed with a rulemaking on reactor decommissioning with the goal of submitting a final rule to the Commission by the end of fiscal year 2019. As a result the NRC issued a draft regulatory basis (RB) on March 15, 2017 (Ref. 10) and the associated regulatory analysis (RA) for the draft RB on May 9, 2017 (Ref. 11) for public comments. Public comments were received by the NRC staff, which resulted in the issuance of the regulatory basis on November 27, 2017 (Ref. 12) in the *Federal Register* and the associated RA for the RB (Ref. 13), which form the basis for this regulatory analysis document for the proposed rule.

## **1.2 Statement of the Problem**

Once a licensee enters the decommissioning phase, certain regulations that applied during the operating phase might not be necessary during decommissioning due to the shutdown condition of the plant. During its review of the overall decommissioning regulations, the NRC identified areas where the existing regulations could be updated or clarified to be more consistent with, or more appropriately reflect, the requirements necessary to maintain reasonable assurance of adequate protection of public health and safety and the common defense and security at a decommissioning power reactor. These areas of decommissioning are discussed in more detail below with NRC recommendations to address the potential changes.

In developing the regulatory basis, the NRC explored multiple alternatives for each area of decommissioning, including developing guidance, pursuing rulemaking, and maintaining the status quo. Pursuant to 10 CFR 50.12, “Specific exemptions,” the Commission may grant exemptions from regulations if the Commission determines the exemptions are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security, and when special circumstances are present, such as when application of the regulation is not necessary to achieve the underlying purpose of the rule. Experience has demonstrated that licensees for decommissioning power reactors seek multiple exemptions and license amendments per site to establish a long-term licensing framework for decommissioning. By issuing a decommissioning rule, the NRC would be able to modify its regulations commensurate with the reduced risk associated with permanently shutdown and defueled reactors and maintain safety and security at sites transitioning to decommissioning, without the need to grant specific exemptions, approvals, or issue license amendments related to certain subject matters (e.g., EP, physical security, certified fuel handler training, decommissioning financial assurance, and onsite/offsite liability insurance).

## **1.3 Objectives**

The objectives for the decommissioning rulemaking include:

- Continue to provide assurance of adequate protection of public health and safety and the common defense and security at decommissioning power reactor sites.
- Ensure that the requirements for decommissioning power reactors are clear and appropriate.
- Codify those issues that are found to be generically applicable to all decommissioning power reactors and have resulted in the need for exemptions or license amendments.

- 
- Identify, define, and resolve additional areas of concern related to the regulation of decommissioning power reactors.

#### **1.4 Sections in the Proposed Rulemaking**

The following list shows how each section of this regulatory analysis document corresponds to the technical areas discussed in the proposed rule, part IV, Scope of the Proposal.

- Section 4.1 corresponds to section A, “Emergency Preparedness”
- Section 4.2 corresponds to section B, “Physical Security”
- Section 4.3 corresponds to section C, “Cyber Security”
- Section 4.4 corresponds to section D, “Drug and Alcohol Testing”
- Section 4.5 corresponds to section E, “Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor”
- Section 4.6 corresponds to section F, “Decommissioning Funding Assurance”
- Section 4.7 corresponds to section G, “Offsite and Onsite Financial Protection Requirements and Indemnity Agreements”
- Section 4.8 corresponds to section H, “Environmental Considerations”
- Section 4.9 corresponds to section I, “Record Retention Requirements”
- Section 4.10 corresponds to section J, “Low-Level Waste Transportation”
- Section 4.11 corresponds to section K, “Spent Fuel Management Planning”
- Section 4.12 corresponds to section L, “Backfit Rule”
- Section 4.13 corresponds to section M, “Foreign Ownership, Control, or Domination”
- Section 4.14 corresponds to section N, “Clarification of Scope of License Termination Plan Requirement”

## **2 DECOMMISSIONING INPUTS**

The purpose of this section is to define the inputs that support the definition of the alternatives and cost-benefit analysis.

### **2.1 Decommissioning Levels**

The NRC is proposing to amend its regulations to provide an efficient regulatory framework during decommissioning using a graded approach for certain technical areas. This graded approach is commensurate with the reductions in radiological risk at four levels of decommissioning: (1) permanent cessation of operations and removal of all fuel from the reactor vessel, (2) sufficient decay of fuel in the SFP such that it would not reach ignition temperature within 10 hours under adiabatic heatup conditions, (3) transfer of all spent fuel to dry storage, and (4) removal of all fuel from the site. These levels are discussed further as follows:

#### **2.1.1 Level 1**

Level 1 commences after the NRC’s docketing of the licensee’s certifications of permanent cessation of operations and permanent removal of the fuel from the reactor vessel pursuant to 10 CFR 50.82, “Termination of license,” or 10 CFR 52.110, “Termination of license.” In this level, a decommissioning reactor is defueled and permanently shut down, but the spent fuel in the SFP is still susceptible to a zirconium fuel cladding fire within 10 hours under adiabatic

---

heatup conditions if the SFP is unexpectedly drained. This configuration encompasses the period from immediately after the core is removed from the reactor to just before the decay heat of the hottest assemblies is low enough that no rapid zirconium oxidation would take place within 10 hours. The NRC anticipates licensees will remain in Level 1 for a period of at least 10 months for a boiling-water reactor (BWR) or 16 months for a pressurized-water reactor (PWR). During this time period, an appropriate level of EP is maintained to respond to applicable design basis accidents and to ensure a prompt response to the low likelihood possibility that a rapid drain down of the SFP could cause a subsequent zirconium fire and release in less than 10 hours.

### **2.1.2 Level 2**

In Level 2, the reactor is defueled and permanently shut down, and spent fuel in the SFP has decayed and cooled sufficiently that it cannot heat up to clad ignition temperature within 10 hours under adiabatic conditions. In this configuration, the spent fuel can be stored long term in the SFP. The NRC anticipates that spent fuel in this decommissioning level will be stored in the pool for at least five years after the spent fuel is moved from the reactor vessel to the SFP. In addition, the site may possess a radioactive inventory of liquid radiological waste, radioactive reactor components, and contaminated structural materials. The radioactive inventory during this configuration may change, depending on the licensee's proposed shutdown activities and schedule.

### **2.1.3 Level 3**

In Level 3, the NRC anticipates that more than 5 years have elapsed since the reactor permanently ceased operation and was defueled and that all spent nuclear fuel is in dry cask storage (e.g., an ISFSI facility). The decision for a licensee to transfer all fuel to an ISFSI facility is based, in part, on such plant-specific factors as the timing and method of plant decommissioning, the preexistence of a licensed ISFSI, and the anticipated start of fuel shipments to a Federal high level waste repository or a monitored retrievable storage (MRS) facility. To evaluate the potential effects of alternatives considered in this analysis, the NRC assumed that the spent fuel is stored in an onsite ISFSI for 16 years before the spent fuel is transmitted to either an offsite ISFSI or a permanent geologic repository. This is based on a recently submitted decommissioning plan for transferring all the spent fuel to a U.S. Department of Energy (DOE) long-term storage repository (Ref. 14).

### **2.1.4 Level 4**

In Level 4, all spent nuclear fuel has been removed from the site. The site may possess a radioactive inventory of liquid radiological waste, radioactive reactor components, and contaminated structural materials. The radioactive inventory during this configuration may change, depending on the licensee's proposed decommissioning activities and schedule. There are no credible accident sequences that can result in significant offsite radiological consequences. As a result, the potential accidents that could occur during the decommissioning of a nuclear power reactor in Level 4 have negligible offsite and onsite consequences.

## **2.2 Decommissioning Experience of Recent Plants**

Between early 2013 and the end of 2014, the licensees of five power reactor units, as listed in [Table 2](#), permanently ceased operation. It is the NRC's understanding that economics

associated with low wholesale electricity prices, the costs of capital improvements, or the costs of major facility repairs were the primary reasons leading to the decisions to permanently shut down these reactors. These were the first reactors to transition to decommissioning since 1998 – an interval of nearly 15 years without a power reactor permanently shutting down. These recent reactor shutdowns were unexpected and involved minimal preplanning.

During approximately a three-year period (2013-2016), over 70 decommissioning related licensing actions and other regulatory actions were processed for the five decommissioning reactor units. This period of increased licensing activity for plants shutting down is commonly referred to as the decommissioning transition process. These decommissioning transition licensing actions established a regulatory framework for decommissioning reactors, and are based, in large part, on the reduced risks to public health and safety and the common defense and security posed by the facility. For decommissioning reactors, the number of potential accidents is fewer and risks of radiological releases are reduced when compared to an operating reactor. Therefore, decommissioning licensees request certain amendments to their licenses and certain exemptions from the NRC’s operating regulations that reflect this reduction in risk.

[Table 2](#) and [Table 3](#) summarize the licensing activities associated with the five reactor units that recently went through the decommissioning transition process.

Table 2 Licensing Activity Summary for Recent Permanently Shutdown Reactors

Site	Permanent Shutdown Date	Decommissioning Strategy <sup>a</sup>	Public Meetings and Briefings	Licensing Actions
Kewaunee	May 2013	SAFSTOR	3	22
Crystal River Unit 3	February 2013	SAFSTOR	3	16
SONGS, Units 2 and 3	June 2013	DECON	8	15
Vermont Yankee	December 2014	SAFSTOR	2	26
<b>Totals</b>			<b>16</b>	<b>79</b>

<sup>a</sup> Decommissioning strategies are discussed in Section 3.2 of this document.

Table 3 Licensing Actions Summary for Recent Permanently Shutdown Reactors

Site	Exemptions	Amendments	Order Rescissions	Other	Total
Kewaunee	9	4	3	6	22
Crystal River Unit 3	5	5	2	4	16
SONGS, Units 2 and 3	6	4	2	3	15
Vermont Yankee	9	7	4	6	26
<b>Totals</b>	<b>29</b>	<b>20</b>	<b>11</b>	<b>19</b>	<b>79</b>

### 3 IDENTIFICATION OF AFFECTED ATTRIBUTES

The NRC developed an inventory of impacted attributes that can be found in Chapter 5 of the NRC’s “Regulatory Analysis Technical Evaluation Handbook” (Ref. 15). These attributes are as follows:

- Industry Implementation: This attribute accounts for the one-time projected net economic effect on the affected licensees to implement the rulemaking objectives.

- 
- Industry Operation: This attribute accounts for the projected net economic effect caused by routine and recurring activities that impact all affected licensees. The economic effect includes procedural and administrative activities to process license amendments and exemptions.
  - NRC Implementation: This attribute accounts for the one-time projected net economic effect on the NRC to place the proposed alternative into operation.
  - NRC Operation: This attribute accounts for the projected net economic effect on the NRC caused by routine and recurring activities after the proposed action is implemented. The economic effect includes procedural and administrative activities to process license amendments and exemptions.
  - Other Government: This attribute is an impact which measures the net economic effect of the proposed action on the federal government (other than the NRC) and state and local governments resulting from the action's implementation or operation.
  - General Public: This attribute accounts for out-of-pocket costs paid by members of the general public as a result of implementation or operation of proposed action.
  - Environmental Considerations: This attribute accounts for environmental improvements resulting from the implementation of the proposed alternative relative to the regulatory baseline that have not been addressed through use of a generic or programmatic environmental impact statement or environmental assessment.
  - Regulatory Efficiency: This attribute accounts for regulatory and compliance improvements resulting from the implementation of the proposed alternative relative to the regulatory baseline.

#### **4 IDENTIFICATION AND ANALYSIS OF ALTERNATIVES FOR THE DECOMMISSIONING AREAS**

The NRC considered the following general approaches to address the regulatory problem identified in Section 1.2:

- Alternative 1: Take no action
- Alternative 2: Amend the decommissioning requirements through rulemaking

Fourteen areas of decommissioning are considered individually. Each area of decommissioning includes the above alternatives, the assumptions for the alternatives, and the impacted attributes.

##### **4.1 Emergency Preparedness**

The EP requirements in 10 CFR 50.47, "Emergency plans," and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50 continue to apply to a nuclear power reactor after permanent cessation of operations and removal of fuel from the reactor vessel. Currently, no explicit regulatory provisions distinguish EP requirements for a power reactor that has permanently ceased operations from those for an



---

operating power reactor. To establish a level of EP commensurate with the risk at a decommissioning site, licensees request exemptions from the regulatory EP requirements early in the decommissioning process, and the NRC thoroughly reviews each one on a case-by-case basis.

The NRC has previously approved exemptions from the emergency planning regulations in 10 CFR 50.47 and Appendix E to 10 CFR Part 50 at permanently shutdown and defueled power reactor sites. The agency granted these exemptions based, in part, on the NRC's determination that the spent fuel at the decommissioning licensee's facility had sufficiently decayed to eliminate applicable design-basis events that could result in an offsite radiological release exceeding the limits established by the U.S. Environmental Protection Agency's (EPA's) early phase protective action guides (PAGs) of 1 rem at the exclusion area boundary.

The NRC also relied on analyses that showed that a beyond-design-basis zirconium fire in the SFP is highly unlikely. This conclusion was based on the amount of time necessary before the spent fuel could reach the zirconium ignition temperature during a SFP draindown event. Based on reasonably conservative adiabatic heatup calculations, a minimum of 10 hours for the time to heatup to zirconium ignition temperature has been used as part of the basis to support the approval of exemptions from portions of the EP regulations. The 10 hour period allows for the licensee to take onsite mitigation measures or, if necessary, for offsite authorities to take appropriate response actions using an all-hazards approach emergency management plan.

Between 1987 and 1999, the NRC issued exemptions from EP requirements for ten licensees. In EP exemptions issued in 2014 and 2015 for four decommissioning licensees,<sup>1</sup> the NRC required the licensees to have sufficient trained personnel on shift, and equipment and procedures to implement their site-specific preplanned mitigation strategies within a 2-hour timeframe. These mitigation strategies are required by a license condition until the spent fuel is removed from the SFP. Licensees that have been granted EP exemptions must maintain an onsite emergency plan addressing the classification of an emergency, notification of emergencies to licensee personnel and offsite authorities, and coordination with designated offsite government officials following an event declaration so that, if needed, offsite authorities may implement appropriate response actions. The EP exemptions also relieve the licensee from the requirements of 10 CFR 50.47 and Appendix E to 10 CFR Part 50 as they pertain to offsite radiological emergency preparedness (REP), including the requirement to maintain the 10 mile plume exposure pathway and the 50-mile ingestion pathway emergency planning zones (EPZs).

In addition, licensees must pay fees to the Federal Emergency Management Agency (FEMA) and the participating states and localities to fund their activities that support the offsite radiological EP program. FEMA regulations in 44 CFR Part 350, "Review and Approval of State and Local Radiological Emergency Plans and Preparedness" (Ref. 16), address the review and approval of offsite response organizations' emergency plans and procedures for responding to radiological emergencies at commercial nuclear power plants. Under 44 CFR Part 354, "Fee for Services to Support FEMA's Offsite Radiological Emergency Preparedness Program" (Ref. 17), FEMA establishes the methodology to assess and collect user fees. The fees are to recover the obligated amounts for the radiological EP program. FEMA has established both site-specific

---

<sup>1</sup> The recent exemptions for emergency planning have been granted for Kewaunee Power Station (Ref. 18), Crystal River Unit 3 Nuclear Generating Plant (Ref. 19), San Onofre Nuclear Generating Station, Units 2 and 3 (Ref. 20), and Vermont Yankee Nuclear Power Station (Ref. 21).

---

and flat fees. The site-specific component is related to plume exposure pathway exercises (Ref. 22). Pursuant to 44 CFR 354.4(e), licensees are required to pay these fees until FEMA receives a copy from the NRC of its approval of exemptions from 10 CFR 50.54(q) requirements stating that offsite radiological emergency planning and preparedness are no longer required at the exemption-requesting licensee's nuclear power plant site. Following the receipt of these approved exemptions, FEMA will no longer assess a user fee for that site from the beginning of the next fiscal year.

Because there are no explicit regulatory provisions distinguishing EP requirements for a nuclear power reactor that has permanently ceased operations from those for an operating power reactor, the NRC is proposing to amend the EP requirements in 10 CFR Part 50, including 10 CFR 50.47, 10 CFR 50.54(q), (s), and (t), and Appendix E to 10 CFR Part 50, and add alternative requirements in new Section 10 CFR 50.200. The objectives of this rulemaking are to: (1) define the level of EP appropriate for a decommissioning nuclear power plant site from the time of permanent cessation of operations until such time that no EP would be required and (2) minimize the need for licensees to request, and the staff to review, exemptions from emergency preparedness regulations for relief from requirements that are no longer necessary.

#### **4.1.1 Alternative EP-1 (No-action alternative)**

Under the no-action alternative, the EP requirements in 10 CFR 50.47, 10 CFR 50.54(q) and Appendix E to 10 CFR Part 50 would remain unchanged and would continue to apply to a nuclear power reactor after permanent cessation of operations and removal of fuel from the reactor vessel. Every nuclear power reactor licensee must establish and maintain emergency plans and preparedness in accordance with these regulations. The regulations include standards for both onsite and offsite emergency response plans. These regulations and the planning basis for EP are based upon an anticipated prompt response to a wide spectrum of events. But for a decommissioning site, the number of accidents that can have significant offsite consequences is greatly reduced and dominated by the zirconium fire scenario. The current regulations do not address that there is considerably more time to respond to a postulated zirconium fire incident at a decommissioning site than for postulated operating reactor accidents.

Because certain EP requirements designed for operating reactors impose regulatory burden on licensees undergoing decommissioning that is not necessary to protect the public health and safety, licensees generally request exemptions from these requirements. Under the current exemption process described in NSIR/DPR-ISG-02 (Ref. 23), exemptions to offsite EP requirements must be supported by a number of analyses, including a site-specific analysis demonstrating that fuel stored in the SFP would not reach the zirconium ignition temperature in less than 10 hours following a beyond-design-basis accident that involves a major loss of water inventory from the SFP. These exemption requests require extensive analysis by the licensee and review by the NRC for each application. The no-action alternative would not relieve the burden imposed on both licensees and the NRC resulting from this case-by-case EP exemption process. In addition, while the exemption process could be further enhanced, this process would not result in the efficiency gains possible through Alternative EP-2. By continuing to assess EP exemptions for individual licensees, licensees and the NRC would continue to expend resources to prepare and process exemption requests. The RG 1.184 "Decommissioning of Nuclear Power Reactors," gives an overview of the current decommissioning process and illustrates that the majority of the administrative burden incurred by licensees and the NRC is in the first several years of decommissioning.

---

The NRC's approval of the requests for exemption from certain requirements of 10 CFR 50.47 and Appendix E to 10 CFR Part 50 allows licensees to initiate the process of establishing a permanently defueled emergency plan (PDEP) and a permanently defueled emergency action level (EAL) scheme. A licensee could submit the PDEP to the NRC for prior review and approval and the NRC would document its determination on the PDEP in a safety evaluation report (SER). The NRC approval of the PDEP would document that the licensee has maintained reasonable assurance that adequate protective measures can and will be taken in a radiological emergency and would provide an approved emergency plan as a licensing basis against which future changes could be compared. Alternatively, a licensee could determine that the adoption of the PDEP would not constitute a reduction in effectiveness of the emergency plan per 10 CFR 50.54(q) because of the change in the licensing basis for the plant resulting from the granting of the exemption request, and as such, the licensee could opt to implement the change without prior NRC review and approval. With respect to the permanently defueled EAL scheme, its adoption is considered to be a scheme change, and per the requirements of Section IV.B.2 of Appendix E to 10 CFR Part 50, the licensee would submit it to the NRC for prior review and approval as a license amendment request pursuant to 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit."

#### **4.1.2 Alternative EP-2 (Rulemaking to amend regulations to provide a graded approach to emergency preparedness / emergency plan changes between levels with NRC approval)**

In this alternative, the NRC would propose a graded approach to EP that is commensurate with the reductions in radiological risk at the four levels of decommissioning discussed in Section 2.1. The levels and proposed areas of EP requirements are discussed below. This alternative differs from Alternative EP-1 because the reduction of EP requirements occurs in Alternative EP-1 only if exemptions are requested by the nuclear power plant licensees and approved by the NRC.

Under this alternative, the NRC and FEMA must establish a notification process that would replace the existing NRC/FEMA process for terminating the assessment of FEMA user fees following the receipt from the NRC of its approved exemptions from pertinent 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50 requirements. The new notification process would inform FEMA that offsite radiological emergency planning and preparedness are no longer required at a particular commercial nuclear power plant site after the spent fuel has cooled for a period of 10 months for BWRs or 16 months for PWRs and the licensee has submitted its certifications required by 10 CFR 50.82(a)(1) or 10 CFR 52.110(a). This change also requires FEMA to perform a rulemaking to amend 44 CFR 354.4(e), "Discontinuation of charges," to reflect this new process.

##### Level 1: Post Shutdown Emergency Plan (PSEP)

Licensees would enter Level 1 after the NRC's docketing of the licensee's certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel pursuant to 10 CFR 50.82(a)(1) or 10 CFR 52.110(a). A PSEP provides a transition period from the EP requirements for an operating reactor to the requirements for a decommissioning reactor where the spent fuel has decayed for at least 10 months for a BWR or 16 months for a PWR. This transition would reduce the regulatory burden associated with EP requirements that are no longer necessary at a permanently shutdown and defueled power reactor facility. For this analysis, the NRC estimates that licensees will remain in Level 1 for a period of 10 months for BWRs or 16 months for PWRs from the date of permanent cessation of operations. The

---

following discussion addresses current requirements that the NRC proposes to amend to support a transition from Level 1 to a Level 2 PDEP while still providing for adequate protection of the public health and safety during this transition period.

#### *PSEP Staffing and Emergency Response Organization*

In Level 1, the proposed rule would allow a licensee transitioning to a PSEP to revisit staffing levels and the staffing analysis performed under Section IV.A.9 of Appendix E to 10 CFR Part 50 for the Emergency Response Organization (ERO) in order to align staffing with the reduced spectrum of credible accidents for a permanently shutdown and defueled power reactor facility. The proposed amended requirement would acknowledge that the spectrum of credible accidents requiring a response from the ERO at a facility that is permanently shutdown and defueled is reduced as compared to an operating plant, and the principal public safety concern involves the potential radiological risks associated with the storage of spent fuel onsite in the SFP. The reactor, reactor coolant system (RCS), and reactor support systems are no longer in operation and have no function related to the storage of spent fuel. Therefore, postulated accidents involving a failure or malfunction of the reactor, RCS, or reactor support systems are no longer applicable. As such, certain ERO positions and emergency functions as detailed in NUREG-0654/FEMA-REP-1, Revision 1, Table B-1 (Ref. 24), may not be applicable or necessary in Level 1 under a PSEP. Commensurate with the reduced spectrum of credible accidents, the NRC is proposing changes to the guidance on ERO staffing levels for Level 1. The NRC has developed a draft of a new guidance document, DG-1346, "Emergency Planning for Decommissioning Nuclear Power Reactors," as part of this rulemaking.

#### *PSEP Emergency Action Levels*

Section IV.C of Appendix E to 10 CFR Part 50 requires licensees to develop a set of emergency action levels (EALs) based not only on onsite and offsite radiation monitoring information but also on readings from a number of sensors that indicate a potential emergency, such as the pressure in containment and the response of the emergency core cooling system. The proposed rule would allow licensees transitioning to a PSEP to revise EALs consistent with the profile of a permanently shutdown and defueled power reactor facility. Although there may be no credible event that could result in significant radiological release beyond the site boundary when a facility enters Level 1, the purpose of Level 1 is to ensure that adequate EP is in place to ensure a prompt response even if a highly-unlikely event should occur. To accompany the proposed rule, the NRC would prepare guidance, in DG-1346, for a permanently shutdown and defueled power reactor facility desiring to make an EAL scheme change.

#### *PSEP Evacuation Time Estimate Studies*

Section IV.3 of Appendix E to 10 CFR Part 50 requires licensees to use evacuation time estimates (ETEs) in the formulation of PARs and to provide the ETEs to State and local governmental authorities for use in developing offsite protective action strategies. Licensees must update ETEs on a periodic basis in accordance with the requirements in 10 CFR 50.47(b)(10) and Sections IV.4, IV.5, and IV.6 of Appendix E to 10 CFR Part 50. In the 2011 EP Final Rule (Ref. 25), the NRC amended its regulations regarding ETEs to require licensees to periodically assess changes to the EPZ population. As a result, licensees are required to update their ETE analysis after every decennial census and at any time during the decennial period if the EPZ permanent resident population increases such that it causes the longest ETE value for specific zones to increase by 25 percent or 30 minutes, whichever is less.

---

The NRC concludes that updates to the ETE during Level 1 would provide limited benefit for the enhancement of protective action strategies or offsite evacuation planning. Even if the criteria for updating the ETE analysis were met within the Level 1 timeframe, updating an ETE report may take several months of analysis. After the ETE is updated, the regulations in Section IV.6 of Appendix E to 10 CFR Part 50 require an additional 180 days before an updated ETE can be used to inform PARs and offsite protective action strategies. The additional time and effort needed to develop and implement a revised protective action strategy may exceed the time that a facility would spend in Level 1 and would also be counter to the purpose of Level 1 as a transition period during the decommissioning process. Additionally, based on the NRC's review of submitted ETEs, population changes within a period comparable to the Level 1 timeframe are unlikely to impact ETEs enough to affect the formulation of protective action strategies. Because formal offsite REP planning and pre-planned PARs for evacuations in response to a radiological emergency would not be requirements of Level 2 (see discussion below), updates to the ETE during Level 1 would provide almost no benefit. For these reasons, the NRC is proposing to amend 10 CFR Part 50, Appendix E, Section IV.4 to clarify that the ETE requirements of paragraphs 4, 5, and 6 of 10 CFR Part 50, Appendix E, Section IV would no longer be applicable to licensees after the NRC docket the certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel. Existing ETE analyses would remain effective within the emergency plan until no longer required with PDEPs (i.e., in Level 2).

#### *PSEP Annual Dissemination of Public Information*

Section IV.D.2 of Appendix E to 10 CFR Part 50 currently requires licensees to make annual dissemination of basic emergency planning information to the public within the plume exposure pathway EPZ. Several commenters stated that this requirement should no longer apply to decommissioning sites. Section II.G of NUREG-0654/FEMA-REP-1, Revision 1 (Ref. 26), contains criteria for the information that should be included in the annual dissemination of public information, including educational information on radiation, points of contact, protective measures, and information for special needs populations. During the period of plant operation, EPZ residents will have had adequate opportunity to become aware of this information and much of this information is likely to remain unchanged from year to year. Starting in Level 2, and consistent with the removal of requirements for formal offsite REP for decommissioning sites (including the removal of EPZ requirements), the NRC would not require annual dissemination of public information. However, for Level 1, the change in the plant's operating status and the ensuing changes to the EP program prompt the need to provide a final dissemination of information to the public. This final dissemination would explain the decommissioning process and the resultant changes to the onsite and offsite EP that are likely to occur over the next several years. Although, the NRC is not proposing regulatory changes related to disseminations of public information, the NRC is issuing DG-1346 for public comment in conjunction with this proposed rule that provides guidance on one method acceptable to the NRC for this final dissemination of information for licensees with PSEPs. This new guidance would be developed as part of Alternative EP-2.

#### *PSEP Drill and Exercises*

Section IV.F of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(14) include requirements for periodic drills and exercises for licensees. Given the low probability of design-basis accidents (DBAs) or other highly unlikely events that could result in exceeding the EPA PAGs, as well as the available time to initiate mitigation measures consistent with plant conditions, the previously routine progression to a General Emergency in power reactor site scenarios is not

---

applicable to a decommissioning site. Therefore, the licensee would not be expected to demonstrate response to as wide a spectrum of events as it was during its operating phase. Beginning in Level 1, exercise scenarios could be reduced commensurate with the permanent cessation of power reactor operations and removal of fuel from the reactor vessel to reflect a smaller suite of potential accident scenarios.

Section IV.F.2.c of Appendix E to 10 CFR Part 50 also requires that offsite REP plans for each site be exercised biennially with full participation by each offsite authority having a role under the radiological emergency plan. Depending upon when the licensee starts the decommissioning process, a full participation exercise could potentially be required during Level 1. As the risk of an accident resulting in a radiological release offsite is significantly reduced in Level 1 and because regulatory standards for offsite REP programs would not be a requirement of Level 2, there would be limited safety benefit to performing full-scale participation exercises simulating a release with offsite consequences during the time a licensee is in Level 1. The NRC anticipates that it will need to clarify further through regulation or guidance the timing and scope of full participation drills and exercises in relation to the licensee's 8-year exercise cycle and the timeline for decommissioning. The NRC will make any potential changes to the timing and scope of drill and exercise requirements in consultation with FEMA. This new regulation would be developed as part of Alternative EP-2.

#### *PSEP Emergency Response Data System*

Section VI of Appendix E to 10 CFR Part 50 outlines a set of system, testing, and implementation requirements for the Emergency Response Data System (ERDS). These systems transmit near real-time electronic data directly between the licensee's onsite computer system and the NRC Operations Center. Nuclear power facilities that are shut down permanently or indefinitely are currently not required to provide hardware to interface with the NRC receiving system under 10 CFR Part 50, Appendix E.

Under Alternative EP-2, ~~the NRC is proposing to require~~ licensees in Level 1 ~~to~~would maintain the capability to provide meteorological, radiological, and SFP data (e.g., level, flow, and temperature data) to the NRC within a reasonable timeframe under 10 CFR 50.72. The NRC assumes in this regulatory analysis that this clarification does not represent a material change in how the ERDS is implemented for Alternative EP-1.

#### *Hostile Action Requirements*

In the 2011 EP Final Rule, the NRC amended its regulations to include enhancements to EP in response to a hostile action event. In Appendix E to 10 CFR Part 50, Section IV.B.1 includes providing EALs for hostile action, Section IV.E.8.d includes alternative facilities for the staging of ERO personnel, Section IV.I provides for protective actions for onsite personnel, and Section IV.F.2.c.4 and Section IV.F.2.i include hostile action scenarios in drills and exercises. These EP requirements related to hostile action are separate and distinct from physical protection regulations in 10 CFR Part 73. As discussed below, hostile action requirements would not apply to decommissioning sites that have progressed to Level 2. The NRC has determined that maintaining provisions for hostile action within onsite and offsite radiological emergency plans is prudent given the condition of the facility in Level 1.

As such, the NRC is proposing to maintain EP requirements related to hostile action during Level 1. However, consistent with the above discussion on drill and exercise requirements, the NRC concludes that continuing with full-participation hostile-action-based (HAB) exercises

---

would provide limited safety benefit to a facility that is decommissioning. Under Alternative EP-2, NRC proposes to amend the regulations to remove the HAB exercise requirement from the 8-year exercise cycle starting in Level 1, although security-based EALs would remain in place as potential initiating events for drills and exercises. The removal of the full-participation HAB exercise requirement would be performed as part of Alternative EP-2.

### Level 2: Permanently Defueled Emergency Plan

For plants that have permanently shut down and defueled (Level 1), the proposed EP approach is based primarily on conditions that: (1) a postulated radiological release would not exceed the EPA PAGs at the exclusion area boundary for DBAs applicable to a permanently shutdown and defueled reactor, and (2) sufficient time would exist to take prompt mitigative actions in response to a postulated zirconium fire accident scenario in the SFP and, if warranted, for offsite officials to take appropriate response actions to protect public health and safety. The NRC's analysis of spent fuel decay times provided information on fuel heatup time to 900°C as a function of cooling time for both PWR and BWR assemblies. The analysis also included sensitivities to the mass of the racks and the fuel configuration in the SFP. Based on this analysis, the NRC concludes that after a cooling period of 10 months for BWRs or 16 months for PWRs, the spent fuel cannot reasonably heat up to clad ignition temperature within 10 hours. The NRC proposes to amend the regulations to allow licensees to transition to a permanently defueled emergency plan, or PDEP (Level 2) after a specified time. Also, the proposed change would allow licensees to submit an analysis for NRC approval demonstrating that an alternate (e.g., shorter) spent fuel decay period would ensure that spent fuel would not heat up to 900°C in less than 10 hours under adiabatic conditions. Under the proposed rulemaking Alternative EP-2, licensees would be required to submit this analysis under 10 CFR 50.90 and the analysis would need to be approved by the NRC in order for a licensee to transition to a PDEP (Level 2) in less than 10 months (for a BWR) or 16 months (for a PWR). The NRC would issue DG-1346 for public comment in conjunction with this proposed rule that provides guidance on one method acceptable to the NRC for conducting the spent fuel heatup analysis.

### *PDEP Offsite Radiological Emergency Response Plans*

Under the proposed rule, NRC planning standards would no longer apply to offsite radiological emergency response plans in Level 2. The transition to a PDEP would be conditioned upon analyses performed by the NRC that the licensee is wholly capable of and responsible for mitigating the consequences of an event. In its review of several exemption requests, the NRC has concluded that as long as a period of at least 10 hours is available to initiate mitigation measures or to implement appropriate response actions offsite, formal offsite radiological emergency plans required under 10 CFR Part 50 are not necessary for permanently shutdown and defueled nuclear power reactor licensees with a PDEP.

For transition to a PDEP, site conditions would need to provide a period of at least 10 hours to initiate mitigation measures or to implement appropriate response actions off site. The NRC concludes that such time is ample to take appropriate actions without the extensive preplanning and other requirements of the EP framework for operating plants, and, therefore, regulatory standards for offsite radiological emergency plans would no longer be necessary for the adequate protection of public health and safety. Licensees with PDEPs would still maintain a variety of onsite capabilities that may be available to support OROs in EP and response, including radiological training; regular coordination with OROs; radiological assessment capabilities; memoranda of understanding for firefighting, law enforcement, and ambulance/medical services; and the ability to make PARs upon request. For licensees with

---

PDEPs, no action would be expected or required from State or local government organizations in response to an event at a decommissioning site other than onsite firefighting, law enforcement, and ambulance/medical services. The NRC contends that this clarification to the offsite radiological emergency response plans does not represent a material change in how licensees meet the EP requirements from Alternative EP-1 after the NRC grants the exemption request.

#### *PDEP Staffing and Emergency Response Organization*

For licensees with PDEPs, the proposed rule would include staffing requirements similar to the current requirements in § 50.47(b)(1), § 50.47(b)(2), and paragraph IV.A of Appendix E to 10 CFR Part 50 with the exception of changes made to reflect the small staffing levels required to operate the facility and the removal of formal offsite radiological emergency response requirements for licensees with PDEPs. For example, licensees with PDEPs would not have to comply with the requirement under 10 CFR Part 50, Appendix E, Section IV.A.3 to augment the ERO with staff from licensee headquarters. Decommissioning sites typically have a level of emergency response that does not require response by headquarters personnel. Licensees would not have to identify State and/or local officials responsible for protective actions, as currently required under 10 CFR Part 50, Appendix E, Section IV.A.8 because offsite emergency measures are limited to onsite support provided by local police, fire departments, and ambulance and hospital services, as appropriate. The proposed rule would require licensees with PDEPs to include in their emergency plans plant staff emergency assignments.

In addition, the staffing analysis required under 10 CFR Part 50, Appendix E, Section IV.A.9 would no longer apply to licensees with PDEPs. In the 2011 EP Final Rule, the NRC concluded that the staffing analysis requirement was not necessary for non-power reactor licensees because of the small staffing levels required to operate the facility. For this same reason, licensees with PDEPs would no longer be required to perform this analysis under the proposed rule.

As licensees transition to a PSEP, staffing levels may be reduced but must remain commensurate with the need to safely store spent fuel at the facility in a manner that is protective of public health and safety. New guidance would be developed as part of Alternative EP-2 to provide one method acceptable to the NRC for ERO staffing during Level 2.

#### *PDEP Emergency Classification Levels and Emergency Action Levels*

Section IV.C.1 of Appendix E to 10 CFR Part 50 requires that emergency action levels are based, in part, on onsite and offsite radiation monitoring data. The proposed rule would require licensees with PDEPs to establish a standard emergency classification level (ECL) and EAL scheme, the bases of which include facility system and effluent parameters. The proposed EAL and ECL requirements for licensees with PDEPs would be analogous to 10 CFR Part 50, Appendix E, Sections IV.B and IV.C with the exceptions of the requirements to base EALs on offsite monitoring information and the 10 CFR Part 50, Appendix E, Section IV.B.1 requirement to include hostile action based EALs. For facilities with PDEPs, the proposed rule would specify that only the ECLs of Notification of Unusual Event and Alert would apply (and not the ECLs of Site Area Emergency and General Emergency that apply to operating reactors). The proposed requirements would be accompanied by new guidance as part of Alternative EP-2.



---

### *PDEP Emergency Assessment, Classification, and Declaration*

Section IV.C.2 of Appendix E to 10 CFR Part 50 currently requires licensees to maintain the capability to assess, classify, and declare an emergency condition within 15 minutes. A decommissioning power reactor has a low likelihood of a credible accident resulting in radiological releases requiring offsite protective measures and the event progression is much slower compared to that for operating reactors. For these reasons under Alternative EP-2, the NRC proposes to amend the regulations so that licensees with PDEPs (in Level 2) would not be required to assess, classify, and declare an emergency condition within 15 minutes. Instead, the NRC is proposing that licensees with PDEPs must document and maintain the capability to assess, classify, and declare an emergency condition as soon as possible and within 60 minutes after the availability of indications that an EAL has been exceeded and must promptly declare the emergency condition as soon as possible following identification of the appropriate ECL. The NRC estimates in this analysis that this change in the reporting timing requirement from 15 minutes to as soon as possible and within 60 minutes would result in an inconsequential cost burden difference from Alternative EP-1 for the case that the licensee submits and the NRC grants an exemption request.

### *PDEP Notification Requirement to State and Local Governmental Agencies*

Section IV.D.3 of Appendix E to 10 CFR Part 50 currently requires licensees to have the capability to notify OROs of an emergency declaration within 15 minutes. Under this alternative, licensees in Level 2 would be required to promptly notify OROs and to make this notification no later than 60 minutes after declaring an emergency. Because of the low probability of DBAs or other credible events that would be expected to exceed the EPA PAGs and the available time to initiate mitigation measures consistent with plant conditions or, if necessary, to implement protective actions, the NRC concludes that 60 minutes provides sufficient time for ORO notification in Level 2.

Under Alternative EP-2, the NRC proposes to amend the regulations to require licensees to promptly notify to State and local governmental agencies and to make this notification as soon as possible and within 60 minutes after declaring an emergency. The NRC estimates in this analysis that this change in the notification time requirement from 15 minutes to as soon as possible and within 60 minutes would result in an inconsequential cost burden difference from Alternative EP-1 for the case that the licensee submits and the NRC grants an exemption request.

### *PDEP Public Alert and Notification Systems*

Section IV.D.3 of Appendix E to 10 CFR Part 50 currently requires licensees to demonstrate that appropriate governmental authorities have the capability to make a public alerting and notification decision promptly on being informed of an emergency condition. Because of the low probability of DBAs or other credible events that would be expected to exceed the limits of EPA PAGs offsite and the available time for event mitigation, the NRC concluded that the public alert and notification system would not be required for licensees in Level 2. Similarly, exercises of this system, as required under Section IV.F.2 of Appendix E to 10 CFR Part 50 would no longer be required for licensees with PDEPs (in Level 2).

Under Alternative EP-2, the NRC proposes to amend the regulations to provide a non-mandatory relaxation of this alert and notification system requirement. However, licensees in Level 2 would still be required to maintain the capability to notify responsible State and local

---

governmental agencies within 60 minutes after declaring an emergency, and research has shown sufficient time would be available to inform the public and implement protective actions, if necessary. The NRC estimates in this analysis that the proposed change would result in an inconsequential cost burden difference in how the public alert and notification system is maintained and exercised from Alternative EP-1 for the case that the licensee submits and the NRC grants an exemption request.

### *PDEP Emergency Planning Zones*

Emergency Planning Zones (EPZs) are defined as the areas for which planning is needed to assure prompt and effective actions can be taken to protect the public in the event of an incident. The requirements of 10 CFR Part 50 state that the EPZs associated with each nuclear power plant must be defined both for the shorter-term plume exposure pathway and the longer-term ingestion exposure pathway. Because of the low probability of DBAs or other credible events that would be expected to exceed the EPA PAGs offsite, and the available time to initiate mitigation measures consistent with plant conditions, the potential offsite consequences would not warrant maintaining the plume exposure pathway and ingestion exposure pathway EPZs in Level 2. If necessary, sufficient time would be available for OROs to implement appropriate response actions even for the worst case severe accident.

Therefore under Alternative EP-2, the NRC proposes to amend the regulations to clarify that the planning standards of 10 CFR 50.47(b) do not apply to offsite radiological emergency response plans if the licensee's emergency plan is not required to meet these planning standards or if the plume exposure pathway EPZ does not exceed the site area boundary. In addition to licensees with PDEPs (in Level 2), future licensees of small modular reactors or other nuclear technologies may be permitted to have a plume exposure pathway EPZ that does not exceed the site area boundary, and this proposed paragraph would clarify applicability of the 10 CFR 50.47(b) planning standards to these facilities as well.

### *PDEP Offsite Radiological Protective Action Recommendations*

Licensees must develop a range of protective actions for the plume exposure pathway EPZ for emergency workers and the public and to give consideration to evacuation, sheltering, and the use of potassium iodide per the current requirements in 10 CFR 50.47(b). Also, licensees must develop and put in place guidelines for the choice of protective actions during an emergency and develop protective actions for the ingestion exposure pathway EPZ.

Under Alternative EP-2, licensees with PDEPs (in Level 2) would be required to continue to develop a range of protective actions for emergency workers and the public but, consistent with the removal of regulatory standards for offsite radiological EP for these licensees, would not reference specific offsite protective actions or pre-planned activities for the public in the EPZs. The proposed requirement would require preplanned PAR strategies for emergency workers who may have to respond to the decommissioning site for firefighting, law enforcement, and ambulance/medical services and members of the public present within the owner-controlled area during a radiological emergency. For licensees in Level 2, preplanned offsite protective actions to ensure a prompt response to a radiological emergency on site are not necessary given the time available for OROs to implement appropriate response actions. Although the likelihood is extremely low for events that would result in doses in excess of the EPA PAGs to the public beyond the owner-controlled area boundary based on the permanently shutdown and defueled status of the reactor, the NRC would require licensees in Level 2 to determine the magnitude of and continually assess the impact of a radiological release and, if a release is

---

occurring, the licensee staff would be required to communicate that information to offsite authorities within 60 minutes for their consideration in taking appropriate response actions.

The NRC estimates in this analysis that the proposed change would result in an inconsequential cost burden difference in how the licensee maintains the range of protective actions for the plume exposure pathway EPZ for emergency workers and the public from Alternative EP-1 for the case that the licensee submits and the NRC grants an exemption request.

#### *PDEP Evacuation Time Estimate Studies*

Currently licensees are required to develop and update Evacuation Time Estimates (ETEs) in accordance with 10 CFR 50.47(b) and Section IV.3 of Appendix E to 10 CFR Part 50. Section IV.3 requires licensees to use ETEs in the formulation of protective action recommendations (PARs) and to provide ETEs to State and local governmental authorities for use in developing offsite protective actions strategies. Under Alternative EP-2 and consistent with the determination for EPZs and PARs, the NRC would not require licensee with PDEPs (in Level 2) to maintain ETEs.

#### *PDEP Emergency Facilities and Equipment*

Section IV.E of Appendix E to 10 CFR Part 50 requires licensees to maintain and describe adequate provisions for emergency facilities and equipment, including equipment at the site for personnel monitoring, equipment for radiological assessment, facilities and supplies for decontaminating onsite individuals, first aid facilities and medical supplies, arrangements for qualified medical service providers and the transportation of contaminated injured individuals, and arrangements for the treatment of individuals injured in support of licensed activities. Decommissioning licensees have not received exemptions or license amendments for these requirements to date and the NRC has determined that licensees with PSEPs (in Level 1) and PDEPs (in Level 2) would still need to maintain these capabilities. As a result, the NRC has not proposed an alternative for how the licensee maintains and describes adequate provisions for emergency facilities and equipment from Alternative EP-1.

#### *PDEP Hostile Action Requirements*

Part 50, Appendix E, Section IV.A.7 defines "hostile action" as an act directed toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end, as it applies to the capability of implementing EP during such events. However, in the Statement of Considerations for the 2011 EP Final Rule, the NRC excluded nonpower reactors from the definition of "hostile action" because a nonpower reactor as defined in 10 CFR 50.2, "Definitions," is not a nuclear power plant, and a regulatory basis had not been developed to support the inclusion of nonpower reactors in the definition of "hostile action." A facility with a PDEP (in Level 2) would be similar to a nonpower reactor in that it has a small operating staff and a low likelihood of a credible accident resulting in radiological releases requiring response actions off site. As such, power reactor facilities transitioning to a PDEP do not fall within the scope of "hostile action," and enhancements to EP in response to hostile action, such as alternative facilities for the staging of ERO personnel, protection of onsite personnel, and challenging drills and exercises involving hostile action, are not warranted. However, elements for security-based events would be maintained for these facilities, including EALs for security-based events. For physical security, the objective for these facilities relates to protection of the spent fuel against sabotage. A level of security commensurate with the consequences of a sabotage event is required and is

---

evaluated on a site-specific basis. The severity of the consequences declines as fuel ages and thereby removes over time the underlying concern that a sabotage attack, under the current definition, could cause offsite radiological consequences.

Under Alternative EP-2, power reactor licensees transitioning to a PDEP (Level 2) would be required to identify ORO resources that would respond to a security event, and the assistance licensees expect from those resources would be maintained in PDEPs. The NRC estimates in this analysis that the treatment of hostile action requirements does not represent a change in burden from Alternative EP-1 after the NRC grants the exemption request.

#### *PDEP Drills and Exercise*

The proposed rule would require licensees with PDEPs to conduct periodic exercises to evaluate major portions of emergency response capabilities, conduct periodic drills to develop and maintain key skills, and correct deficiencies identified as a result of exercises and drills. The proposed requirements differ from the existing requirements under 10 CFR Part 50, Appendix E, Section IV.F to account for changes in principal functional areas, offsite radiological emergency response requirements, offsite PAR requirements, and the spectrum of accidents possible at a PDEP facilities. The regulatory analysis assumes that this will not represent a change in burden from Alternative EP-1 after the NRC grants an exemption request.

#### *PDEP Offsite Response Organization Participation in Drills and Exercises*

Section IV.F of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(14) include requirements for periodic EP drills and exercises for licensees. Paragraph IV.F.2.c of Appendix E to 10 CFR Part 50 requires offsite REP plans for each site to be exercised biennially with full participation by offsite authorities having a role under the radiological response plan. Under the proposed rule, because no action is required from State and local government organizations in response to an event other than onsite firefighting, law enforcement, and ambulance/medical services, the requirements related to ORO participation in radiological drills and exercises would no longer be relevant for licensees with PDEPs. Licensees with PDEPs would be required to enable any State or local government to participate in the licensee's drills when requested. The regulatory analysis assumes that relaxing ORO participation in radiological drills and exercises from mandatory participation to an opportunity to participate (i.e., voluntary participation) does not represent a change in burden from Alternative EP-1 after the NRC grants an exemption request.

#### Level 3: All Spent Fuel Transferred to an Independent Spent Fuel Storage Installation

A licensee with all of its spent fuel in dry cask storage that terminates its 10 CFR Part 50 or 10 CFR Part 52 license must first obtain a 10 CFR Part 72 specific license before transitioning to the EP requirements already provided in § 72.32(a). A licensee maintaining its 10 CFR Part 50 or 10 CFR Part 52 license, and thus its 10 CFR Part 72 general license authorized under § 72.210, "General license issued," may opt to change its EP program to align it with the requirements of § 72.32 once all spent fuel is transferred to dry cask storage. In addition, licensees with 10 CFR Part 72 general licenses would need to continue to comply with all applicable 10 CFR Part 50 and 10 CFR Part 52 requirements until the 10 CFR Part 50 or 10 CFR Part 52 license is terminated. The proposed rule would require that licensees with an independent spent fuel storage installation-only emergency plan (IOEP) must follow and maintain the effectiveness of an emergency plan that meets the requirements in § 72.32(a).

---

#### Level 4: All Spent Fuel Removed from Site

Once all spent fuel has been permanently removed from the site, a licensee can terminate its EP program because the site no longer poses any risk of a radiological release.

#### Additional Amendments for Emergency Preparedness

##### *Change to Emergency Plans*

Licensees are required by 10 CFR 50.54(q)(2) to follow and maintain the effectiveness of an emergency plan that meets the standards in 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50. In addition, 10 CFR 50.54(q) contains the conditions under which the licensee may make changes to its emergency plan without prior application to and approval by the NRC, provided that the changes do not reduce the effectiveness of the plan and that the plan, as changed, continues to meet the standards in 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50.

The proposed rule would add new requirements, similar to § 50.54(q)(2) and § 50.54(q)(3), referencing the requirements that emergency plans for decommissioning power reactors must meet and the process for making these changes. The proposed rule would establish the process for: (1) transitions between EP decommissioning levels (i.e., PSEP, PDEP, IOEP) and (2) changes to emergency plans within an EP decommissioning level. ~~The NRC does not anticipate any EP-related changes to 10 CFR 50.59 as a result of this rulemaking alternative.~~

##### *Program Element Review under 10 CFR 50.54(t)*

Under 10 CFR 50.54(t), licensees must conduct reviews of EP program elements either: (1) at intervals not to exceed 12 months, or (2) as necessary, based on an assessment by the licensee against performance indicators, and as soon as reasonably practicable after a change occurs in personnel, procedures, equipment, or facilities that potentially could adversely affect EP. If a licensee chooses the second option, it must still review all program elements at least once every 24 months. The proposed rule would amend § 50.54(t) such that, starting after the NRC's docketing of certifications under § 50.82(a)(1) or § 52.110(a), licensees would be able to conduct program element reviews under § 50.54(t) at intervals not to exceed 24 months (rather than 12 months) without conducting an assessment against performance indicators. As a result, it is expected that licensees would conduct a program element review shortly after implementing a PDEP. With this proposed change, the NRC seeks to ensure that a licensee evaluates its EP program soon after it transitions to a PDEP.

##### *Reasonable Assurance and Offsite Radiological Emergency Preparedness*

Every 10 CFR Part 50 or 10 CFR Part 52 license includes as a condition of the license the requirements of 10 CFR 50.54(s)(2)(ii) and (s)(3), regarding findings and determinations of reasonable assurance. For decommissioning power reactors, the proposed rule would state that if regulatory standards for offsite radiological EP are not required, then findings and determinations by FEMA would not be needed in order for the NRC to make determinations regarding reasonable assurance under § 50.54(s)(2)(ii). Therefore, the proposed rule would clarify that FEMA findings and determinations are only necessary when the NRC's planning standards apply to offsite radiological emergency response plans. As a result, FEMA fees would no longer apply in these cases. The regulatory analysis did not identify any change in

---

burden for this provision between that required for Alternative EP-1 after the NRC grants the exemption request and for Alternative EP-2.

#### Development of Regulatory Guides

Under Alternative EP-2, the NRC would develop a new EP-specific guidance document for decommissioning facilities that would be issued for public comment with the proposed rule.

#### **4.1.3 Assumptions**

The regulatory analysis has made the following assumptions:

- In Alternative EP-1, all nuclear power plant licensees would file exemption requests and amendment requests from pertinent 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50 requirements so that they may obtain the benefits described in Alternative EP-2 above.
- For Alternative EP-2, each licensee would not submit a site-specific analysis, but instead would wait the pre-determined time, which will be specified by rulemaking, before transitioning from Level 1 to Level 2.
- For Alternative EP-2, the regulatory analysis assumes that the notification requirements performed for Alternative EP-1 will be reflected in the proposed guidance.
- For Alternative EP-2, the regulatory analysis assumes that staffing and emergency response organization requirements do not represent a material change in burden from Alternative EP-1 after the NRC grants the exemption requests.

#### **4.1.4 Affected Attributes**

Industry Implementation: Under Alternative EP-2, the number of requests for exemptions that licensees typically submit from EP requirements would be reduced, resulting in a one-time benefit (i.e., averted cost) to industry for plants that enter decommissioning after issuance of the rule. Additionally the licensees would commit additional resources to participate in the public meeting and comment period for the proposed rule.

Industry Operation: Under Alternative EP-2, licensees might avoid recurring FEMA fees due to the time period between when the fuel in the SFP has sufficiently decayed such that it would not reach ignition temperature within 10 hours under adiabatic heatup conditions and the finalization of the exemption from emergency preparedness.

NRC Implementation: To implement Alternative EP-2, the NRC incurs a one-time cost in order to develop the rule and the EP specific guidance. For Alternative EP-2, the number of exemptions from and amendments to 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50 requirements would be reduced, which would result in a benefit (i.e., averted cost) to the NRC due to lack of reviewing these exemptions and amendments.

Other Government: To implement Alternative EP-2, the NRC and FEMA would establish a notification process that replaces the existing NRC/FEMA process for terminating the assessment of FEMA user fees. The FEMA would also incur one-time costs to develop and issue a final rule to amend 44 CFR 354.4(e) to reflect this new process. Under Alternative EP-2

---

the state, local governments and FEMA would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: Under Alternative EP-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

## **4.2 Physical Security**

Whether they hold a license under 10 CFR Part 50 or 10 CFR Part 52, nuclear power reactor licensees are subject to various security requirements in 10 CFR Part 73, “Physical Protection of Plants and Materials.” Such requirements include those in Appendix B to Part 73, “General Criteria for Security Personnel,” Appendix C to Part 73, “Safeguards Contingency Plans,” 10 CFR 73.54, “Protection of digital computer and communication systems and networks, and 10 CFR 73.55, “Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage.” If the power reactor site has an associated independent spent fuel storage installation (ISFSI) under the general license granted by 10 CFR 72.210, “General license issued,” the licensee must protect the ISFSI in accordance with 10 CFR 72.212, “Conditions of general license issued under 10 CFR 72.210.”

Under the existing regulations, each nuclear power reactor licensed under 10 CFR Part 50 or 10 CFR Part 52, remains subject to the requirements in 10 CFR 73.55 to maintain a Commission-approved physical security plan, training and qualification plan, safeguards contingency plan, and cyber security plan. The regulations in 10 CFR 73.55(b)(3) require the physical protection program to be designed to prevent significant core damage and spent fuel sabotage. The regulations further require the licensee to have a physical protection program that ensures that the capabilities to detect, assess, interdict, and neutralize threats (up to and including the design-basis threat (DBT) of radiological sabotage, as stated in 10 CFR 73.1, “Purpose and scope,”) are maintained at all times. The regulations in 10 CFR 73.55(b)(3) also require that the licensee’s physical protection program provides defense in depth through the integration of systems, technologies, programs, equipment, supporting processes, and implementing procedures to ensure the program’s continued effectiveness.

During the initial transition from operation to decommissioning, the reactor is permanently shutdown and the spent fuel is permanently moved from the reactor vessel to a SFP. Although the potential adversary targets are fewer, and in fewer locations, the licensee is currently responsible for identifying and analyzing the “new” site-specific conditions to account for possible adversary approaches consistent with the changes in facility configuration. At this step in the process, licensees with reactors in the decommissioning process have submitted to the NRC various changes and requests for exemptions from the NRC security requirements under 10 CFR 73.5, “Specific Exemptions,” requests for license amendments under 10 CFR 50.90, and security plan changes under 10 CFR 50.54(p). In accordance with 10 CFR 50.54(p)(2), a licensee may make security plan changes that do not decrease the safeguards effectiveness of the security plan without prior NRC approval. Licensees must provide a report of the security plan change to the NRC within 2 months of the change.

Currently, there are no regulatory provisions distinguishing physical security requirements for a power reactor that has permanently ceased operation from those for an operating power reactor. As a result, decommissioning reactor licensees and the NRC have expended resources for processing security-related licensing actions, such as exemption and license amendment requests. Licensees that have transitioned to decommissioning have sought and received NRC approval of exemptions and amendments to reduce physical security

---

requirements no longer needed or no longer relevant because the configuration of the site has changed and the risk presented by a decommissioning plant is much less than when it was operating.

Additionally, licensee and NRC resources are also spent reviewing security plan changes to ensure all revisions either do not reflect a decrease in safeguards effectiveness or are submitted to the NRC for review and approval prior to implementation in accordance with 10 CFR 50.54(p). The lack of a regulatory definition for “a decrease in safeguards effectiveness” complicates this process, therefore the NRC is proposing to amend the current regulation to provide clarity for licensees and staff for security plan changes.

#### **4.2.1 Alternative PS-1 (No-action alternative)**

The no-action alternative would retain the current physical security regulatory structure for power reactor licensees during operation and decommissioning. Each nuclear power reactor licensed under 10 CFR Part 50 or 10 CFR Part 52 would continue to remain subject to the current requirements in 10 CFR 73.55 to maintain a Commission approved physical security plan, training and qualification plan, safeguards contingency plan, and cyber security plan. Under this alternative, the NRC would continue to process requests from licensee undergoing decommissioning for exemptions from certain requirements and to process license amendment for the security commitments in existing license conditions.

#### **4.2.2 Alternative PS-2 (Rulemaking)**

Under this alternative, the NRC would streamline the decommissioning process by allowing licensees to make changes to NRC-required security programs during decommissioning that reflect the reduced number of target sets and therefore a reduction in risk without having to request either an exemption or amendment. These changes include commonly requested exemptions and amendments made by decommissioning licensees and typically approved by the NRC. Under this alternative, the NRC will continue to review security plan change reports submitted by licensees and will continue to provide oversight of licensee security programs at decommissioning power reactors through a security inspection program that verifies the licensees’ compliance with applicable regulatory requirements.

In addition, this alternative would pursue rulemaking to implement proposed changes, which are discussed in detail below, to the physical security requirements for decommissioning power reactors. Once a licensee certifies under 10 CFR 50.82, “Termination of License,” that it has: (1) permanently ceased operation and (2) permanently removed fuel from the reactor vessel, and these certifications have been docketed by the NRC, changes to the operations of the plant will support a step-down in the physical security requirements currently imposed on operating reactors through regulations and orders. The following areas of physical security will be considered for modification in the rulemaking:

- **Security Plans.** The NRC is proposing to revise § 50.54(p) to include definitions of the terms “change” and “decrease in safeguards effectiveness.” The application of these definitions is limited to the revised § 50.54(p) and will apply to operating, decommissioning, and decommissioned reactor licensees. The term “change” would be defined in a new § 50.54(p)(1)(i) to mean an action that results in a modification of, addition to, or removal from, the licensee’s security plans. The term “decrease in safeguards effectiveness” would be defined in a new § 50.54(p)(1)(ii) to mean a change or series of changes to an element or component of the security plans referenced in this



---

section that reduces or eliminates the licensee's ability to perform or maintain the capabilities set forth in § 73.55(b)(3)(i) without compensating changes to other security plan elements or components.

The NRC is proposing that decommissioning and operating reactor licensees include in the required § 50.54(p)(2) report a summary of the supporting analysis for the licensee's determination that the change does not decrease safeguards effectiveness. The summary must be sufficient to demonstrate that the change does not decrease the safeguards effectiveness of the plan.

- **Dry Cask Storage.** Power reactor licensees that operate an ISFSI may hold either a general or specific license for the ISFSI. Under 10 CFR 72.212(b)(9), general license ISFSIs are subject to the same physical security requirements in 10 CFR 73.55 as power reactors, with some exceptions. By contrast, licensees that hold a specific license under 10 CFR Part 72 are subject to the physical security requirements of 10 CFR 73.51, "Requirements for the physical protection for spent nuclear fuel and high-level radioactive waste," which are less stringent than the 10 CFR 73.55 requirements.

During the decommissioning process, power reactor licensees with a general license ISFSI will transition to a phase when all the spent fuel has been removed from the SFP and placed in a dry cask storage system (DCSS). At this point, the security measures needed to protect the facility from radiological sabotage decrease significantly. Once the reactor ceases to operate, certain requirements in 10 CFR 73.55, (e.g., protection against significant core damage) are no longer necessary because there is no fuel in the reactor core. General ISFSI licensees must submit license amendments and requests for regulatory exemptions to obtain relief from the more stringent requirements. The NRC has previously exempted decommissioning licensees that have placed all fuel in a DCSS from the requirements of 10 CFR 73.55, and has allowed the licensees to commit to following the ISFSI-specific physical security requirements in 10 CFR 73.51 which reflect a level of physical protection significantly less than that required at operating power reactors and decommissioned facilities with fuel in the SFP.

The NRC is proposing that once all spent nuclear fuel (SNF) has been placed in dry cask storage, licensees may elect to follow the proposed § 72.212(b)(9)(vii) and protect a general license ISFSI in accordance with the physical security requirements in § 73.51. A licensee may use the process set forth in the revised and renumbered § 50.54(p)(3) to make this change and submit its revised physical security plan to the NRC. These security plans must continue to address the applicable security-related orders associated with an ISFSI that are conditions of the license. The NRC is also proposing conforming changes to § 72.13, "Applicability," to reflect the requirements that would apply to a licensee that elects to follow the proposed § 72.212(b)(9)(vii).

- **Significant Core Damage.** Under 10 CFR 73.55(b)(3), a nuclear power reactor licensee's physical protection program must be designed, in part, to prevent significant core damage. A nuclear power reactor that has permanently ceased operations no longer has fuel in the reactor vessel. Therefore, there is no potential for an emergency shutdown to prevent significant core damage or a radiological release because there is no core that would pose a radiological risk. Accordingly, licensees no longer need to protect against significant core damage once all fuel is in the SFP or in a DCSS. Training of security personnel for this condition is also no longer warranted. Therefore, the NRC is proposing that a licensee of a decommissioning nuclear power reactor no

---

longer be required to meet the requirement in § 73.55(b)(3) to protect against significant core damage once the reactor has permanently ceased operating and all fuel has been removed from the reactor vessel. The requirement to protect against spent fuel sabotage would remain in place as long as spent fuel remains on the site.

- **Vital Areas.** Under 10 CFR 73.55(e)(9), licensees are required to protect the reactor control room as a vital area. A vital area is defined in 10 CFR 73.2 as any area which contains vital equipment; under 10 CFR 73.2, vital equipment means any equipment, system, device, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. The NRC also considers the equipment or systems that would be required to function to protect public health and safety following such a failure, destruction, or release to be vital. The role of the reactor control room at an operating plant is described in 10 CFR Part 50, Appendix A, General Design Criterion 19. General Design Criterion 19 specifies that the control room must be a protected space from which actions can be taken to operate the nuclear power plant safely and without interruption under normal or accident conditions.

For a permanently shutdown and defueled facility, the vital equipment associated with operating the reactor vessel is no longer needed and the remaining vital equipment (e.g., associated with SFP cooling) ~~may no longer be needed or~~ may be relocated to a vital area separate from the control room or, at a certain point, may no longer be needed. Once a reactor has permanently ceased operations, the need for a reactor control room is eliminated if all of the vital equipment is removed and if the area does not serve as the vital area boundary for other vital areas. The NRC is proposing to revise § 73.55(e)(9)(v) to provide that a licensee of a decommissioning nuclear power reactor would no longer need to designate the reactor control room as a vital area if it does not otherwise meet the definition of a vital area in § 73.2.

- **Communications.** Under 10 CFR 73.55(j)(4)(ii), the NRC requires that a system for continuous communication capabilities with the control room must terminate in the central and secondary alarm stations to ensure effective command and control during both normal and emergency conditions. One purpose of this requirement is to ensure that communications are maintained between security operations and reactor operators who are normally located in the control room. A nuclear power reactor that has permanently ceased operations and no longer has fuel in the reactor vessel may no longer have reactor operators or a control room; therefore, the NRC is proposing to amend § 73.55(j) to require continuous and redundant communications be maintained between the central alarm station and the certified fuel handler (CFH), as defined in 10 CFR 50.2, or senior on-shift licensee representative once the reactor has ceased operations and the licensee no longer has licensed senior operators in the control room. The intention of this change is to allow licensees flexibility in maintaining communications with one or both of these individuals.
- **Suspension of security measures.** The NRC is proposing to amend 10 CFR 73.55(p) to permit a CFH to approve the temporarily suspension of security measures during certain emergency conditions or during severe weather at decommissioning nuclear power reactors whose 10 CFR 50.82(a) certifications have been docketed. Currently, the security requirements in 10 CFR 73.55(p)(1)(i) provide that a “licensee may suspend any security measures under this section in an emergency when this action is immediately needed to protect the public health and safety.... This suspension of security measures must be approved as a minimum by a licensed senior operator before

---

taking this action.” Similarly, 10 CFR 73.55(p)(1)(ii) provides that a licensee may suspend security measures during “severe weather when the suspension of affected security measures is needed to protect the personal health and safety of security force personnel.... This suspension of security measures must be approved, as a minimum, by a licensed senior operator, with input from the security supervisor or manager, before taking this action.” The licensee for a nuclear power reactor that has permanently ceased operations and no longer has fuel in the reactor vessel may no longer employ or have on site a licensed senior operator. As currently written, these provisions are not clear as to whether the suspension of security measures to protect the public or the security personnel in the instance of severe weather could be accomplished at a decommissioning reactor without first requesting an exemption. The NRC proposes to modify the regulatory language to clarify that a licensed senior operator or CFH can make this decision.

### 4.2.3 Assumptions

The regulatory analysis assumes the following for the cost-benefit analysis of Physical Security:

- All nuclear power plant licensees will file exemption and amendment requests to reduce their physical security requirements that are commensurate with the benefits for the recommended rulemaking.
- Docketing of the certifications submitted under 10 CFR 50.82 meets the requirements for stepping down the physical security requirements.

### 4.2.4 Affected Attributes

Industry Implementation: Under Alternative PS-2, licensees would not need to apply for exemptions and amendments for reducing their physical security requirements. This would result in a one-time benefit (i.e., averted cost) for industry. Under Alternative PS-2, the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

NRC Implementation: To implement Alternative PS-2, the NRC would incur a one-time cost relative to the status quo for developing the rule. Under Alternative PS-2, licensees would not need to apply for exemptions and amendments to reduce their physical security requirements, which results in a benefit (i.e., averted cost) for the NRC due to lack of reviewing these exemptions and amendments.

Other Government: Under Alternative PS-2, the State and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: Under Alternatives PS-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

Regulatory Efficiency: The current regulatory process of removing certain 10 CFR Part 73 requirements through exemptions and the process of changing license conditions related to physical security by amendments introduces regulatory burden to licensees and the NRC. Under Alternative PS-2, licensees that proceed through decommissioning would no longer need to submit physical security exemption requests, license amendment requests, or order withdrawal requests to the NRC to receive certain relaxation from physical security

---

requirements. This would allow licensees to complete their decommissioning operations without diverting resources to submit these requests.

### **4.3 Cyber Security**

As stated in § 73.54, applicants and licensees must provide high assurance that their digital computer and communication systems and networks associated with safety and important-to-safety, security, and emergency preparedness functions are adequately protected against cyber attacks, up to and including the design basis threat described in § 73.1, “Purpose and scope.” To accomplish this, each holder of a nuclear power reactor operating license under 10 CFR Part 50 has submitted a cyber security plan (CSP) to the NRC that has been approved by the NRC. Further, combined license (COL) applicants are required to submit their CSP as part of their COL application for review and approval. Approved CSPs are referenced as license conditions in each Part 50 license and continue to apply until the license is terminated or the license condition is removed by license amendment. A COL holder does not have an equivalent cyber security license condition.

The cyber security requirements in § 73.54 apply to licensees currently licensed to operate a nuclear power plant. Once the NRC has docketed a licensee’s § 50.82(a)(1) or § 52.110(a) certifications, that licensee is no longer authorized to operate a nuclear power plant. Therefore, the requirements in § 73.54 would no longer apply to such a licensee. However, each Part 50 licensee has a license condition requiring the licensee to maintain its CSP, and this license condition remains in effect during decommissioning. A COL holder, without the license condition, is not required to maintain its CSP when it begins decommissioning.

#### **4.3.1 Alternative CS-1 (No-action alternative)**

Under the no-action alternative, the NRC would not change the current cyber security requirements set forth in 10 CFR 73.54. These requirements are applicable to 10 CFR Part 50 licensees and applicants, and to applicants and holders of COLs in accordance with 10 CFR 52.79(a)(36)(iii). Once a licensee has filed the certifications required by either 10 CFR 50.82(a)(1)(i) and (ii) or 10 CFR 52.110(a) and those certifications have been docketed by the NRC, the licensee is no longer authorized to operate a nuclear power reactor. Therefore, by its terms, 10 CFR 73.54 does not apply to such licensees, because they are no longer licensed to operate a nuclear power reactor.

Although the cyber security rule no longer applies to a licensee that has filed the certifications required by 10 CFR 50.82(a)(1)(i) and (ii) or 10 CFR 52.110(a) and those certifications have been docketed by the NRC, ~~the each operating~~ license still incorporates the licensee’s CSP as a license condition. As such, a Part 50 licensee must abide by its CSP until the licensee submits a license amendment request to remove the CSP from its license. If a license amendment request is not submitted and approved, in whole or in part, the existing CSP would remain in force even after the submittal and docketing of the 10 CFR 50.82(a)(1) ~~or 10 CFR 52.110(a)~~ certifications. Under the no-action alternative, the NRC expects that Part 50 licensees would continue to submit license amendment requests to have the CSP rescinded once the spent fuel has sufficiently decayed.

#### **4.3.2 Alternative CS-2 (Rulemaking to remove all cyber security requirements when spent fuel has sufficiently decayed)**

Under this alternative, the NRC is proposing to update cyber security requirements set forth in

---

§ 73.54, “Protection of digital computer and communication systems and networks” for nuclear power reactor licensees. This update would clarify the cyber security requirements applicable to a nuclear power reactor during each stage of the decommissioning process. In order to clarify the applicability of the cyber security rule to decommissioning nuclear power reactor licensees, the NRC is proposing to add two subsections to § 73.54. A new § 73.54(i) would state that the requirements of § 73.54 will remain in effect until: (1) the NRC has docketed the licensee’s § 50.82(a)(1) or § 52.110(a) certifications, and (2) at least 10 months for a BWR or 16 months for a PWR have elapsed since the date of permanent cessation of operations or an NRC approved alternative to the 10 or 16 month spent fuel decay period, submitted under proposed § 50.54(q)(7)(ii)(A)–(B), has elapsed.

A new § 73.54(j) would state that, after both requirements of § 73.54(i) have been met, the licensee’s license condition that requires implementation and maintenance of a cyber security plan would be removed from the license. The NRC is also proposing the removal of the first paragraph of § 73.54 and revising the language of § 73.54(a). This is a conforming change to clarify that the applicability of § 73.54 is not limited to “operating” reactors, i.e., that § 73.54 would still be applicable after the NRC has docketed a licensee’s § 50.82(a)(1) or § 52.110(a) certifications, and to remove language that is no longer needed concerning the initial submission of cyber security plans by existing licensees. Further, the NRC is proposing a change to § 73.55(c)(6), which requires the licensee to establish, maintain, and implement a Cyber Security Plan. This is a conforming change to reflect the scenario in which a decommissioning power reactor licensee is no longer required to maintain a cyber security plan (i.e., the fuel in the SFP has sufficiently decayed) , but is still required to comply with § 73.55(c). Extending the requirement to maintain a CSP during decommissioning would be a new requirement imposed on COL holders and so would constitute a violation of issue finality.

### **4.3.3 Assumptions**

The regulatory analysis assumes that all future sites would submit license amendment requests to remove cyber security requirements during decommissioning.

### **4.3.4 Affected Attributes**

Industry Implementation: Under this alternative, industry would not need to submit an amendment to remove their cyber security plans once the spent fuel has met the appropriate conditions when the spent fuel has sufficiently decayed per Alternative CS-2. Under Alternative CS-2, the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

Industry Operation: In Alternative CS-2, COL licensees would remain subject to cyber security protection requirements until the fuel in the spent fuel pool has sufficiently cooled (i.e., 10 months for BWRs and 16 months for PWRs). This alternative will result in additional costs to the COL licensees due to labor hours expended to implement the cyber security requirements for 10 or 16 months.

NRC Implementation: To implement Alternative CS-2 the NRC would incur a one-time cost relative to the status quo for developing the rule.

Other Government: Under Alternative CS-2, the State and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

---

General Public: Under Alternative CS-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

#### **4.4 Drug and Alcohol Testing**

The requirement in 10 CFR 26.3(a) lists those licensees that are required to comply with designated subparts of 10 CFR Part 26, “Fitness for Duty Programs,” including “[I]licensees who are authorized to operate a nuclear power reactor under 10 CFR 50.57, “Issuance of operating license,” and holders of a COL under 10 CFR Part 52 after the Commission has made the finding under 10 CFR 52.103(g). . . .” In accordance with this language, 10 CFR Part 26 does not apply to a holder of a power reactor license issued under 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” that is no longer authorized to operate a nuclear power reactor because the NRC has docketed the certifications required under 10 CFR 50.82(a)(1) (i.e., a decommissioning Part 50 reactor licensee). However, 10 CFR Part 26 continues to apply to holders of COLs issued under 10 CFR Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” throughout decommissioning. Therefore, 10 CFR Part 52 licensees are required to maintain a full fitness for duty (FFD) program during decommissioning, but 10 CFR Part 50 licensees are not subject to the same requirement. The NRC intends to resolve this inconsistency in the application of FFD requirements to Part 50 and Part 52 licensees during decommissioning by clarifying that 10 CFR Part 26 does not apply to 10 CFR Part 52 licensees once the NRC has docketed their 10 CFR 52.110(a) certifications.

Under 10 CFR 73.55(b)(9), nuclear power reactor licensees must implement an insider mitigation program (IMP) that incorporates elements of a 10 CFR Part 26 FFD program. However, 10 CFR 73.55(b)(9) does not specify what those elements are. The purpose of a licensee’s IMP is to help ensure that individuals granted unescorted access authorization (UAA) or unescorted access (UA) to the licensee’s protected area (PA) or vital area (VA) remain trustworthy and reliable and do not pose a threat to the facility. The NRC recognizes that the IMP requirements, including the appropriate elements of the 10 CFR Part 26 program, apply to all personnel granted UAA or UA to the PA or VA equally. This construct makes sense for operating facilities that contain many target sets of potential interest to an adversary. However, the risk associated with decommissioning facilities have significantly decreased in comparison to those associated with the operating facilities. The spent fuel pool and its safety systems become the primary focus of the licensee’s security mission to protect against the DBT as most (if not all) of the other target sets are no longer relevant when a nuclear power reactor is no longer operational. Therefore, the NRC intends to clarify the 10 CFR Part 73(b)(9) IMP rule language by establishing an appropriate set of FFD provisions to be incorporated into the IMP to provide reasonable assurance that individuals granted UAA or UA to the PA or VA are trustworthy and reliable (as demonstrated, in part, by the avoidance of substance abuse).

The NRC also notes that 10 CFR Part 73, Appendix B (section I.B.1.b.(4)) contains requirements addressing drug or alcohol addiction issues for security personnel. Section I.B.2.a of the same appendix requires that security personnel “demonstrate mental alertness and the capability to exercise good judgement.” Although not specifically used as the basis for this rulemaking, continuation of drug and alcohol testing will support the licensee’s continued adherence to these provisions of 10 CFR Part 73, Appendix B.

##### **4.4.1 Alternative DA-1 (No-action alternative)**

The no-action alternative would not address the inconsistency in the scope of 10 CFR Part 26

---

and its application to 10 CFR Part 50 and 10 CFR Part 52 licensees during decommissioning. Therefore, 10 CFR Part 26 would not apply to 10 CFR Part 50 licensees during decommissioning, but would continue to apply to 10 CFR Part 52 licensees during decommissioning. This alternative would also not clarify the appropriate 10 CFR Part 26 FFD elements to be incorporated into a licensee's IMP. Licensees would continue to determine which elements of their 10 CFR Part 26 program to include in their IMPs, as required by 10 CFR 73.55(b)(9)(ii)(B). The NRC has observed that recently decommissioned reactor licensees generally continue to implement all of the elements of 10 CFR Part 26, with the exception of Subparts I and K.

#### **4.4.2 Alternative DA-2 (Rulemaking to require Fitness for Duty program elements that support IMP for power reactors)**

Alternative DA-2 would propose rulemaking to amend 10 CFR 26.3 to correct the inconsistency in the application of 10 CFR Part 26 to 10 CFR Part 50 and 10 CFR Part 52 during decommissioning. This would ensure that similarly situated nuclear power reactor facilities are treated the same. The rulemaking would also clarify the FFD program elements under 10 CFR Part 26 that support a licensee's IMP. This clarification would apply to both 10 CFR Part 50 and 10 CFR Part 52 facilities, but becomes particularly important during decommissioning of 10 CFR Part 50 reactor facilities, as the 10 CFR Part 26 FFD program requirements are currently no longer applicable to these facilities.

Under this alternative, the inconsistency regarding application of 10 CFR Part 26 between 10 CFR Part 50 and Part 52 licensees during decommissioning would be corrected. In addition, the NRC would require that all nuclear power reactor licensees implement the same FFD program elements to support their IMP under the provisions of 10 CFR 73.55(b)(9)(ii)(B). The proposed rule would focus the applicability of the 10 CFR Part 26 elements on individuals who have security-related responsibilities or regular SFP area unescorted access at licensee sites. This approach reflects the reduced potential for insiders to affect radiological sabotage at decommissioning sites and the reduced hazard presented by the spent fuel. These changes would ensure that FFD program elements that are necessary to maintain reasonable assurance that individuals at reactor sites, particularly at decommissioning sites, remain trustworthy and reliable are implemented consistently throughout the industry. These changes will also reduce the number of individuals that are subjected to the FFD elements that satisfy the IMP requirements over the decommissioning time frame.

#### **4.4.3 Assumptions**

In the status quo, the regulatory analysis assumes that at decommissioning, licensees, will continue to implement a full FFD program, with the exception of Subparts I and K, in order to meet the requirements of 10 CFR 73.55(b)(9).

For Alternative DA-2, the NRC assumes that the staffing level at a nuclear power plant in the beginning of decommissioning is 25% of its full staffing level when fully operating. This is based on the fact that the decommissioning Vermont Yankee nuclear power plant has had 150 workers after the start of decommissioning (Ref. 27), whereas the Ginna nuclear power plant has had a peak staff level of 600 workers (Ref. 28).

For Alternative DA-2, the regulatory analysis assumes that 10 percent of the staffing level at a decommissioned nuclear power plant will have access to a vital area.

---

For Alternative DA-2, the regulatory analysis assumes that 30 percent of the staffing level at a decommissioned nuclear power plant will have access to a protected area.

#### **4.4.4 Affected Attributes**

Industry Implementation: To implement Alternative DA-2, industry would incur a one-time cost in making minor changes in their drug and alcohol testing procedures to account for the IMP requirements during decommissioning. Under Alternative DA-2, the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

Industry Operation: Alternative DA-2 will rework the structure of the IMP requirements to allow for an approach commensurate with the hazard and potential event consequences associated with a facility's decommissioning status. As a result, the number of individuals subject to random drug and alcohol testing under 10 CFR 26.31(c)(5) for an operating reactor will be reduced for certain segments of the site's decommissioning population. This will result in the industry's drug and alcohol testing program costs being reduced during decommissioning.

NRC Implementation: To implement Alternative DA-2, the NRC incurs a one-time cost relative to the status quo for the rulemaking process. These costs include the preparation of the proposed and final rule.

NRC Operation: Clarifying the regulations will reduce the burden on the NRC in the administration of reporting requirements for drug and alcohol testing under Alternative DA-2.

Other Government: Under Alternative DA-2, the state and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: Under Alternative DA-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

#### **4.5 Certified Fuel Handler Definition and Elimination of Shift Technical Advisor**

The current regulations for operating reactors require specific staffing levels for licensed operators for each shift, as well as control room staffing requirements and commensurate training requirements for licensed operators. They do not address training requirements for a facility undergoing decommissioning. Licensees have been requesting amendments to their technical specifications to eliminate the need to maintain licensed operators on the staff during decommissioning. In place of the licensed operators, decommissioning plant licensees have required the presence of a CFH, a non-licensed operator (NLO) who has been qualified in accordance with a fuel handler training program approved by the Commission, and an additional NLO as the necessary staff for each shift. Furthermore, decommissioning plants are discontinuing the associated licensed operator training programs.

A CFH at a permanently shutdown and defueled nuclear power reactor undergoing decommissioning is an individual who has the requisite knowledge and experience to evaluate plant conditions and make judgments about what actions are necessary to protect the public health and safety. Because the CFH is defined as an NLO, the NRC has evaluated the CFH training program in accordance with 10 CFR 50.120, "Training and qualification of nuclear power plant personnel," which includes a requirement in 10 CFR 50.120(b)(2) that the training



---

program must be derived from a systems approach to training, as defined in 10 CFR 55.4, and must provide for the training and qualification of certain categories of nuclear power plant personnel, including the NLO category. The NRC notes that, although the definition for a CFH in 10 CFR 50.2 indicates that a fuel handler training program requires Commission approval, the regulations do not have specific requirements that describe what constitutes an acceptable program besides those requirements in 10 CFR 50.120, which apply to all NLOs. Because a training program for an NLO subject to 10 CFR 50.120 does not require Commission approval, unless that NLO is a CFH, the NRC has determined that an acceptable fuel handler training program suitable to qualify a CFH should ensure that the trained individual: (1) has requisite knowledge and experience in the safe conduct of decommissioning activities, (2) has requisite knowledge and experience in the safe handling and storage of spent fuel, and (3) is capable of evaluating plant conditions and exercising prudent judgment for emergency action decisions.

Hence the NRC proposes revising the definition of a CFH in 10 CFR 50.2 to establish these three criteria for an acceptable fuel handler training program. This would eliminate the need for licensees to seek Commission approval of their training programs. Use of the criteria would be optional; licensees could still seek Commission approval for fuel handler training programs suitable to qualify a CFH. The NRC can inspect the implementation of training programs suitable to qualify NLOs and CFHs using existing inspection procedures, such as IP 41501 (Ref. 29).

#### **4.5.1 Alternative CFH/STA-1 (No-action alternative)**

This alternative would retain the current wording of CFH-related regulations. The regulations state, in part, that, “[t]he training program must be periodically evaluated and revised as appropriate to reflect ... changes to the facility, procedures and regulations.” The no-action alternative would not result in any significant additional cost or benefit and the NRC would continue to review, on a case-by-case basis, the training requirements proposed in the requests for approval submitted by the licensees. Additionally, the NRC would make no changes to the regulations regarding the Shift Technical Advisor (STA) position.

#### **4.5.2 Alternative CFH/STA-2 (Rulemaking regarding CFH definition and Shift Technical Advisor)**

Under this alternative, the NRC would propose rulemaking to clarify the requirements for the training of CFHs at decommissioning power reactors. This rulemaking would revise the definition of “certified fuel handler” in 10 CFR 50.2, which would retain the existing definition of the CFH and add an alternative to revise the definition of “certified fuel handler” that would eliminate the need for licensees to seek the Commission’s approval for fuel handler training programs.

Specifically, the NRC would codify current licensing practices by amending § 50.2 to add an alternative definition with three broad-scope objectives as responsibilities for which a CFH must be trained: (1) safe conduct of decommissioning activities; (2) safe handling and storage of spent fuel; and (3) appropriate response to plant emergencies. In addition, the CFH would have to qualify in accordance with a fuel handler training program that meets the same requirements as training programs for non-licensed operators required by § 50.120. Should a licensee not exercise the alternative definition, it would need to submit a request for approval of a fuel handler training program.

---

The NRC proposes to revise a footnote to the table titled “Minimum Requirements Per Shift for On-Site Staffing of Nuclear Power Units by Operators and Senior Operators Licensed Under 10 CFR Part 55” in § 50.54(m)(2)(i) to state that a STA is not required upon the NRC’s docketing of the license holder’s certifications required under §§ 50.82(a)(1) or 52.110(a). Additionally the NRC will update RG 1.184, “Decommissioning of Nuclear Power Reactors” to provide guidance for the staffing requirements at a decommissioning power reactor site.

### 4.5.3 Assumptions

The regulatory analysis has made the following assumptions for the cost benefit analysis of CFH definition and elimination of the STA:

- The development of voluntary industry initiatives would require the same amount of time as the NRC would take to develop a new Regulatory Guide.
- The NRC would take one-half the time to review the industry initiatives as the industry would take to develop them.
- All licenses would choose to use the definition of a CFH that the proposed rulemaking alternative would provide when they establish their fuel handler training programs.

### 4.5.4 Affected Attributes

Industry Implementation: Under Alternative CFH/STA-2, licensees would still need to submit license amendment requests that would replace licensed operators with shift staffing consisting of CFHs and NLOs, for managing the spent fuel at a nuclear power site and conducting decommissioning activities. However, Alternative CFH/STA-2 would eliminate the need for a licensee to seek the Commission’s approval for fuel handler training programs suitable to qualify a CFH. The elimination of this approval process would result in a one-time benefit (i.e., averted cost) for industry. ~~Additionally a licensee would not need to submit an amendment to remove the Shift Technical Advisor.~~ Under Alternative CFH/STA-2, the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

NRC Implementation: To implement Alternative CFH/STA-2, the NRC incurs a one-time cost relative to the status quo for developing the rule. In addition, under Alternative CFH/STA-2, the NRC would no longer have to review fuel handler training programs for their suitability to qualify CFHs. However, the NRC will continue to review license amendment requests for changes to the section of licensees’ technical specifications titled, “Administrative Controls.”

Regulatory Efficiency: Under Alternative CFH/STA-2, licensees in decommissioning would not need to submit fuel handler training programs suitable to qualify CFHs for the Commission’s approval. This would provide licensees with flexibility to complete their decommissioning operations, in that resources will not be expended to process these types of licensing actions.

Other Government: Under Alternative CFH/STA-2, the State and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: Under Alternatives CFH/STA-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

---

## 4.6 Decommissioning Funding Assurance

The NRC requires nuclear power plant licensees to provide reasonable assurance that funds will be available for plant radiological decommissioning. An element of this assurance is the requirement for licensees to provide a minimum decommissioning fund per the formula defined in 10 CFR 50.75(c). The table of minimum amounts formula (NRC minimum formula) was established in 1988 as a means to assure the bulk of funds needed for radiological decommissioning would be available. The requirement in 10 CFR 50.75(c) also defines a process for adjusting the formula to current-year dollars. The NRC uses the formula and adjustment factors to assess the adequacy of the decommissioning trust funds (DTFs) established by the nuclear power plant licensees every two years.

The NRC is proposing changes to address the use of DTFs. The changes would clarify that the DTF can be used to pay for both radiological decommissioning expenses under 10 CFR 50.2 and spent fuel management and 10 CFR Part 72 specific license ISFSI decommissioning, so long as sufficient funding remains for radiological decommissioning. The primary intent of these changes would be to reduce the need for regulatory exemptions with respect to use of the DTF by licensees while ensuring that sufficient funding is available for NRC-required radiological decommissioning. Overall, the NRC anticipates that the recommended changes would minimize the need for licensees to request exemptions from decommissioning funding regulations and that the changes would provide licensees with a greater degree of flexibility in the use of their DTFs.

Currently, DTF regulations do not address the costs associated with the unavailability of permanent spent fuel repositories. However, the lack of permanent spent fuel repositories requires licensees to provide long-term onsite storage of spent fuel in an ISFSI, incur spent fuel management expenses and, ultimately, decommission the ISFSIs. Pursuant to 10 CFR 72.6, licenses for the receipt, handling, storage, and transfer of spent fuel are of two types: general and specific. Licensees may provide financial assurance for the decommissioning of general license ISFSIs with funds in their 10 CFR Part 50 DTFs because general license ISFSI decommissioning falls under the definition of decommission in 10 CFR 50.2. However, licensees may not provide financial assurance for the decommissioning of specific license ISFSIs, as addressed in 10 CFR 72.30, with funds in their 10 CFR Part 50 DTFs without the NRC approval of a regulatory exemption.

When funds are commingled in the DTF and are not distinctly identified, the NRC does not have a mechanism to allow for the use of those funds for non-decommissioning purposes such as spent fuel management or for 10 CFR Part 72 specific license ISFSI decommissioning outside of the exemption process. Because of these issues, licensees have sought and been granted exemptions from 10 CFR 50.75, "Reporting and recordkeeping for decommissioning planning," requirements to allow the use of excess monies from the DTFs that are not needed for radiological decommissioning to pay for expenses associated with spent fuel management. The reliance on exemptions creates regulatory uncertainties as well as burdens on licensees and the NRC. A licensee must expend resources to prepare the documentation and analysis that is required to obtain approval of the exemption request. The NRC must also divert resources from other agency activities to evaluate each request in order to determine whether the exemption request should be granted.

---

#### 4.6.1 Alternative DTF-1 (No-action alternative)

Under the no-action alternative, the regulations to establish and use the DTF would remain unchanged. The regulation would not be amended to address commingling of funds in the DTF for spent fuel management, ISFSI decommissioning, or site restoration. In addition, DTF regulations would not be amended to address costs associated with the long-term onsite storage of spent fuel in an ISFSI, costs which stem from the unavailability of permanent spent fuel repositories. This being the case, licensees are likely to continue to request exemptions in order to address spent fuel management expenses and may also request exemptions to pay for ISFSI decommissioning and site restoration expenses on a case-by-case basis. For example, licensees could choose to submit an exemption request to allow the use of DTF funds for spent fuel management. The NRC would review the exemption request and grant the exemption on a finding of reasonable assurance that sufficient funding will remain available in the DTF to complete radiological decommissioning and upon a determination that the licensee meets the requirements in 10 CFR 50.12, "Specific exemptions."

#### 4.6.2 Alternative DTF-2 (Rulemaking to amend regulations to minimize exemptions and reduce the ambiguity in the decommissioning trust fund regulations)

Under this alternative, the NRC proposes the following changes to current DTF regulations to minimize exemption requests and address the ambiguity in the DTF regulations:

- Amend the regulations at 10 CFR 50.82 to allow decommissioning funds collected and kept in an external trust as required in 10 CFR 50.75, to be used for spent fuel management as well as Part 50 and Part 72 specific license ISFSI decommissioning, so long as sufficient funding remains for radiological decommissioning. Specifically, the NRC proposes to add a new § 50.82(a)(8)(viii) to provide a licensee the option to use its DTF for spent fuel management and specific license ISFSI decommissioning costs only if: (1) the licensee has submitted, and the NRC has docketed, the certifications required under § 50.82(a)(1) ~~or § 52.110(a)~~ to permanently cease reactor operations and defuel the reactor; (2) 90 days have elapsed since the NRC received the licensee's PSDAR under § 50.82; and (3) the licensee has identified excess funds in the DTF. Such excess funds are funds in the DTF that are greater than those funds reasonably needed to maintain compliance with § 50.82(a)(8)(i)(B)-(C), complete radiological decommissioning, and terminate the license. Regardless of whether this option is exercised, a licensee would be required to continue with a series of steps, as specified in § 50.75(a), to comply with all decommissioning funding assurance regulations. A licensee would not be relieved of the responsibility to certify that there is reasonable assurance that decommissioning funding will be available.
- Amend the regulations to modify the reporting requirements in 10 CFR 50.75(f)(1) to be consistent with the reporting frequency for decommissioning funding assurance for ISFSIs in 10 CFR 72.30(c). Licensees would report the status of decommissioning funding on a triennial basis (every 3 years) instead of on a biennial frequency.
- Amend the regulation at 10 CFR 50.75(b) to further clarify that licensees shall maintain decommissioning funding assurance. Licensees would have to correct shortfalls in a timely manner and provide evidence to the NRC during the next reporting cycle under 10 CFR 50.75(f). Current guidance provides that licensees may remedy shortfalls by utilizing the methods described in 10 CFR 50.75(e)(1). Language would be added to address instances when the amount in the DTF falls below the regulatory amount

---

required either by the NRC minimum formula as set forth in 10 CFR 50.75(c) or a licensee's site-specific cost estimate, thereby creating a "shortfall."<sup>2</sup> Conforming changes would be made to 10 CFR 50.82 as part of this rulemaking.

- Amend 10 CFR 50.75 (h)(1)(B)(iv) to be consistent with 10 CFR 50.4, "Written communications," with respect to written notice of intent to make a disbursement or payment from the DTF. This change would require all notice materials be sent to the Document Control Desk instead of the Office Director NRR, as licensees are now directed.
- Eliminate 10 CFR 50.75(f)(2) as it is duplicative of the language of 10 CFR 50.75(f)(1).
- The NRC is proposing to amend the regulations at 10 CFR 50.82(a)(8)(i)(A) and 10 CFR 52.110(h)(1)(i) to remove the term "legitimate." This term does not add any substance to the regulations and is potentially confusing. The intent of the regulation is to ensure that expenses fall within the NRC definition of decommission in 10 CFR 50.2. Whether an expense falls within the definition of decommission would continue to be determined on a case-by-case basis by the licensee when considering whether to make a withdrawal from the DTF. Since this term is non-substantive, its removal will not change any of the existing requirements regarding the use of decommissioning funds.
- The NRC proposes to revise § 52.110 to make the same changes proposed in § 50.82 for consistency. In addition, the NRC proposes to add paragraphs (h)(5) – (h)(7) with site-specific decommissioning cost estimate report requirements which are identical to the requirements in § 50.82(a)(8)(v) – (vii). A report on irradiated fuel should only be submitted if irradiated fuel is on site.
- The NRC proposes to revise § 72.30 so that that the resubmittals subsequent to the initial decommissioning funding plan for ISFSIs will no longer require NRC approval. This change would make the processes under § 72.30(c) more efficient and less burdensome to the licensee, while still maintaining reasonable assurance of adequate funding for the decommissioning of an ISFSI.

The objectives of these proposed changes are to: (1) provide licensees with options for using DTF monies and the flexibility to consider site-specific conditions in maintaining their DTF; (2) create consistent standards for NRC's use in determining whether licensees are compliant with the appropriate use of the DTF; and (3) minimize the need for licensees to submit exemption requests from decommissioning funding regulations.

#### **4.6.3 Assumptions**

The assumptions used in the regulatory analysis for this decommissioning area are:

- For Alternative DTF-1, the regulatory analysis assumes that all operating nuclear power plant sites will submit exemption requests to use a portion of their DTFs for spent fuel management.

---

<sup>2</sup> Shortfall is defined as the difference between the amount of financial assurance provided by the licensee and the amount of financial assurance required.

---

#### **4.6.4 Affected Attributes**

Industry Implementation: Under Alternative DTF-2 licensees would not need to apply for exemptions to use the DTF for spent fuel management. This would result in a one-time benefit (i.e., averted cost) to industry. Under Alternative DTF-2, the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

Industry Operation: Under Alternative DTF-2, licensees would report assurances for decommissioning against the funding in the DTF every 3 years instead every 2 years. This would result in costs averted from the lower frequency of reporting. In addition, licensees who report a shortfall pursuant to 10 CFR 50.75(f) would have to correct the shortfall in a timely manner.

NRC Implementation: To implement Alternative DTF-2, the NRC incurs a one-time cost relative to the status quo for developing the rule. Under Alternative DTF-2, the NRC would avert the cost and resources to evaluate exemption requests to use DTF for spent fuel management.

NRC Operation: Under Alternative DTF-2, the NRC would evaluate the submitted report of assurances for decommissioning against the funding in the DTF on a triennial basis instead of on a biennial basis. This would result in cost averted from the lower frequency of evaluating these reports.

Regulatory Efficiency: Under Alternative DTF-2, licensees would have sufficient internal controls, chart of accounts, and reporting tools to identify distinct funds in the DTF and the licensees' intention for their use would be identified and reflected in accounting practices. These controls and reporting mechanism leads to transparency regarding the intended use of decommissioning trust assets and establishes a clear and consistent regulatory structure. Under Alternative DTF-2, licensees would have more flexibility concerning funding of spent fuel management than currently exists with the status quo (Alternative DTF-1).

Other Government: Under Alternative DTF-2, the state and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: Under Alternative DTF-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

#### **4.7 Offsite and Onsite Financial Protection Requirements and Indemnity Agreements**

To implement the requirements under the Price-Anderson Act (PAA), codified in Section 170 of the Atomic Energy Act of 1954, as amended (AEA), the NRC requires nuclear power plant licensees to comply with regulations for offsite financial protection and indemnity agreements. All nuclear reactors are required to have and maintain offsite financial protection as set forth in 10 CFR 140.11, "Amounts of financial protection for certain reactors." The amounts of insurance required for each large operating reactor (i.e., has a rated capacity of 100,000 electrical kilowatts or more) are set forth in 10 CFR 140.11(a)(4), which are: (1) primary financial protection in the amount of \$450 million; and (2) secondary financial protection consisting of funds from a nuclear industry retrospective rating plan. The Commission executes and issues agreements of indemnity for large operating reactors pursuant to 10 CFR 140.20, "Indemnity agreements and liens." The general form of indemnity agreement to be entered into

---

by the Commission with large operating reactors is provided at 10 CFR 140.92, "Appendix B-Form of indemnity agreement with licensees furnishing insurance policies as proof of financial protection," and 10 CFR 140.93, "Appendix C-Form of indemnity agreement with licensees furnishing proof of financial protection in the form of licensee's resources."

Apart from the PAA requirements, the NRC also requires nuclear power reactor licensees to maintain onsite property insurance. Specifically, 10 CFR 50.54(w) requires licensees to obtain property insurance for each reactor site in the amount of \$1.06 billion, or the maximum amount of coverage generally available from private sources, whichever is less, to stabilize and decontaminate the reactor and the reactor site in the event of an incident. Neither the PAA nor NRC's implementing regulations for large operating reactors explicitly addresses the concept of decommissioning. Likewise, the NRC's onsite insurance requirements do not address the status of facilities during the period of decommissioning or the reduction in risk that is presented by permanently shutdown reactors.

In SECY 93-127, "Financial Protection Required of Licensees of Large Nuclear Power Plants during Decommissioning," (Ref. 30), the NRC staff concluded, "In the interim, exemptions could be granted for reductions in the amount of primary financial protection required to a level which would not prejudice the outcome of rulemaking. The staff believes that a level of \$100 million would be adequate." In the Staff Requirements Memorandum (SRM) for SECY-93-127 (Ref. 31), the Commission authorized the staff to approve, through specific exemptions from the requirements of 10 CFR 140.11(a)(4), termination of participation in the retrospective rating plan and reduction in primary financial protection from \$450 million to \$100 million, after a cooling period adequate to support air cooling of the fuel in a completely drained pool. Similarly, under status quo, and pursuant to the requirements provided in 10 CFR 50.54(w), licensees must have and maintain a minimum coverage limit for each reactor site in the lesser amount of either: \$1.06 billion, or whatever amount of insurance is generally available from private sources. In SECY-96-256, "Changes to Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w)(1) and 10 CFR 140.11," (Ref. 32), the NRC staff recommended changes to the power reactor insurance regulations that would allow licensees to lower onsite insurance levels to \$50 million upon demonstration that the fuel stored in the SFP can be air-cooled. In its SRM for SECY-96-256 (Ref. 33), the Commission supported the NRC's recommendation that, among other things, would allow permanently shutdown power reactor licensees to reduce onsite financial protection coverage to \$50 million when the licensee was able to demonstrate that the spent fuel could be air-cooled if the spent fuel pool was drained of water. The NRC has issued several exemptions from the requirements of 10 CFR 50.54(w) on the basis that the reduced onsite insurance coverage value of \$50 million satisfies the underlying purpose of the rule in funding stabilization of site conditions and cleanup costs associated with decontamination following the hypothetical rupture of a large onsite liquid radioactive waste tank. With the spent fuel adequately cooled by air in a drained spent fuel pool, the potential for a significant release from the spent fuel was considered negligible.

#### **4.7.1 Alternative FP-1 (No-action alternative)**

Under the no-action alternative, licensees will continue to abide by regulations in 10 CFR 140.11(a)(4), which require each reactor that is licensed to operate and has a rated capacity for electrical generation exceeding 100,000 electrical kilowatts to have \$450 million in primary financial protection to remedy a potential offsite release of nuclear material and to participate in the industry retrospective rating plan. Under 10 CFR 50.54(w), licensees will also continue to maintain a minimum coverage limit for each reactor site in the lesser amount of either: \$1.06 billion, or whatever amount of insurance is generally available from private sources. Pursuant to 10 CFR 140.8, "Specific exemptions," and 10 CFR 50.12, "Specific

---

exemptions,” the Commission may grant exemptions from this regulation that it determines are authorized by law and otherwise are in the public interest.

#### 4.7.2 Alternative FP-2 (Rulemaking to codify the current exemption process)

This rule change would allow the licensees of large operating reactors that have permanently shut down a reduction in both offsite and onsite financial protection without the need for licensees to submit requests for regulatory exemptions from financial protection requirements. The objectives of this rulemaking would be to: (1) provide a process that maintains an adequate level of financial protection during decommissioning, and (2) minimize the need for licensees to request exemptions from financial protection requirements that are no longer needed.

This alternative proposes to amend the offsite and onsite financial protection requirements based on the reduced risk of radiological release from the anticipated reactor configurations and adopts reductions in financial protection based on two levels (level one and two) described below. The amounts of financial protection provided in these two levels are consistent with exemptions that have been granted to decommissioned reactors in the past. The insurance amounts would be based on the estimated cost of recovery from limiting hypothetical events for specific level one and two reactor configurations. The below table provides a summary of Level 1 and Level 2, which are described below:

Table 4 Two-Step Graded Approach

Level	Reactor Site Description	Offsite Requirement	Onsite Requirement
1	Operating or Permanently Ceased Operations and Permanently Defueled	\$450 million; participation in the industry retrospective rating plan	\$1.06 billion
2	Sufficiently Decayed Fuel; $\geq 1,000$ gallons of radioactive waste	\$100 million; withdrawal from the rating plan	\$50 million

##### Description of Level 1: Permanently Ceased Operations and Permanently Defueled

Licensees in Level 1 include operating reactors and decommissioning reactors that have docketed certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel pursuant to 10 CFR 50.82 or 10 CFR 52.110. In this level, a decommissioning reactor is defueled and permanently shut down, but the spent fuel in the SFP is still susceptible to a zirconium fuel cladding fire if the SFP is unexpectedly drained, although a very unlikely event. This configuration encompasses the period from immediately after the core is removed from the reactor to just before the decay heat of the hottest assemblies is low enough that no rapid zirconium oxidation will take place within 10 hours under adiabatic conditions. Licensees in Level 1 must maintain the full amounts of offsite and onsite insurance specified in 10 CFR 140.11(a)(4), and 10 CFR 50.54(w), respectively.

##### Description of Level 2: Sufficiently Decayed Fuel

In Level 2, the reactor is defueled and permanently shut down, and spent fuel in the SFP has decayed and cooled sufficiently that it cannot heat up to clad ignition temperature within 10 hours under adiabatic conditions. In this configuration, the spent fuel can be stored long term in



---

the SFP. In addition, the site may possess a radioactive inventory of liquid radiological waste, radioactive reactor components, and contaminated structural materials. The radioactive inventory during this configuration may change, depending on the licensee's proposed shutdown activities and schedule. The transition to Level 2 financial protection amounts could occur after a timeframe based on a site-specific analysis that demonstrates the fuel cannot heat up to clad ignition temperature within 10 hours under adiabatic conditions. In Level 2, the offsite requirements would be reduced from \$450 million in primary financial protection and participation in the industry retrospective rating plan to \$100 million and withdrawal from the industry retrospective rating plan. The Commission determined that the \$100 million was sufficient to cover offsite liability claims such as those incurred as a result of Three Mile Island, Unit 2.

If significant sources of radioactive material remain on site, such that it is greater than or equal to 1,000 gallons of radioactive waste, licensees should be required to maintain an adequate level of onsite insurance coverage. In Level 2, onsite financial protection requirements would be reduced from \$1.06 billion to \$50 million. The \$50 million reflects the potential for a radiological incident resulting from the mobile sources of radioactivity at a permanently shutdown reactor site. A scenario involving the rupture of a large liquid radioactive waste storage tank (approximately 450,000 gallons) containing slightly radioactive water was selected as conceivable and a bounding scenario. For estimating cleanup costs, the limiting event considered costs associated with removal of soil contamination and potential contamination of the ground water table. That postulated event was estimated to result in an onsite waste cleanup cost of approximately \$50 million with negligible radiological consequences off site. In economic terms, it would surpass the cleanup costs associated with a fuel-handling incident, which has been taken into account in determining the upper-bound level of onsite insurance coverage required in Level 2.

Furthermore, the NRC proposes to amend its regulations at §140.81, "Scope and purpose," to clarify the applicability of the requirements for an Extraordinary Nuclear Occurrence (ENO) to reactors in decommissioning. Under Sections 11, "Definition," and 170 of the AEA, and NRC regulations at Subpart E, "Extraordinary Nuclear Occurrences," to 10 CFR Part 140, the Commission is authorized to make a determination as to whether an event at a production or utilization facility causing a discharge or dispersal of source, special nuclear, or byproduct material that has resulted or will result in substantial damages to offsite members of the public or property, is an ENO. An event will qualify as an ENO if the Commission determines that the criteria set forth in §§ 140.84, "Criterion I – Substantial discharge of radioactive material or substantial radiation levels offsite," and 140.85, "Criterion II – Substantial damages to persons offsite or property offsite," have been met. The NRC recognizes that the consequences resulting from an accident at a decommissioning reactor in Level 1 can be similar to an accident at an operating reactor. As presented in NUREG-1738, in the window beginning immediately after the reactor is defueled and the fuel placed in the SFP, the offsite consequences of a zirconium fire may be comparable to those from operating reactor postulated severe accidents. The existing potential consequences from a zirconium fire, until the fuel in the SFP has sufficiently decayed, provides the basis for the NRC's proposal to amend its regulations to include plants in decommissioning within the scope of §140.81

The NRC also proposes to amend § 50.54(w) to include a prompt notification to the Commission of any material change in proof of onsite property insurance filed with the Commission under Part 50. Specifically, the transition to Level 2 as proposed by the NRC will prompt the licensee to notify the NRC under § 50.54(w)(7) of a reduction in onsite property insurance from \$1.06 billion to \$50 million. This proposed amendment to § 50.54(w)(7) would be a conforming

---

change, for consistency, with the offsite financial protection requirements under 10 CFR 140.15(e).

### 4.7.3 Assumptions

The assumptions used in the regulatory analysis for this decommissioning area are:

- For Alternative FP-1, all nuclear reactor licensees will submit exemption requests for onsite and offsite financial protection should the rulemaking not go forward. These exemptions requests will be consistent with the reduction of offsite and onsite financial protection requirements described in levels one and two.
- For Alternative FP-2, the regulatory analysis assumes that each decommissioning licensee would not submit a site-specific analysis that demonstrates the spent fuel in a SFP cannot heat up to clad ignition temperature under adiabatic conditions since they would opt for a decay period of 10 or 16 months.
- For Alternative FP-2 the regulatory analysis assumes that nuclear power reactor sites that have decommissioned would reduce their onsite and offsite financial protection to the minimum requirements of level 2 once they meet the description of this level.
- For Alternative FP-2 the regulatory analysis assumes that the decommissioning financial protection and indemnity regulations will no longer apply following the site passing its confirmatory survey and the NRC terminates the plant license.

### 4.7.4 Affected Attributes

Industry Implementation: Under Alternatives FP-2, licensees would not need to apply for exemptions from offsite and onsite financial protection regulations. This results in a one-time benefit (i.e., averted cost) for each licensee. Licensees would be required to submit a prompt notification to the Commission of any material change in proof of onsite or offsite property insurance filed with the Commission under proposed § 50.54(w)(6) or current § 140.15(e). The industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

NRC Implementation: To implement Alternatives FP-2, the NRC incurs a one-time cost relative to the status quo for developing the rule. Under these alternatives, exemptions would no longer be needed for licensees to receive approval for reduced financial protection. This results in the elimination of staff reviews for these exemption requests and leads to a benefit (i.e., averted cost) for the NRC.

Other Government: Under Alternatives FP-2, the state and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: Under Alternatives FP-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

---

## **4.8 Environmental Considerations**

In certain circumstances, licensees may be unable to satisfy the requirement that licensees conclude in the PSDAR that all environmental impacts associated with site-specific decommissioning activities will be bounded by previous environmental impact statements. NUREG-0586, Supplement 1, Volumes 1 and 2, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors" (Decommissioning GEIS) (Ref. 34) identified two resource areas that were not generically resolved and thus require a site-specific analysis. Four other resource areas were also identified that may require a site-specific analysis. Therefore, if a licensee were unable to reach the conclusion in the PSDAR that all impacts will be bounded, the licensee would have to either change its planned decommissioning activities so that their impacts would be bounded or submit and have approved a license amendment request or an exemption request to satisfy § 50.82(a)(4)(i) or § 52.110(d)(1).

### **4.8.1 Alternative ENV-1 (No Action)**

The no-action alternative would retain the current decommissioning regulations regarding that licensees conclude in the PSDAR that all environmental impacts associated with site-specific decommissioning activities will be bounded by previous environmental impact statements.

### **4.8.2 Alternative ENV-2 (Rulemaking)**

In this alternative, the NRC proposes to change the PSDAR requirements in § 50.82(a)(4)(i) and § 52.110(d)(1) to require that licensees provide the basis for whether or not the environmental impacts from site-specific decommissioning activities are bounded by previous environmental reviews. This rulemaking change would clarify that licensees, at the PSDAR stage, are required to evaluate the environmental impacts and provide in the PSDAR the basis for whether or not the proposed decommissioning activities are bounded by appropriate federally issued environmental review documents. Licensees would no longer be required to make the definitive conclusion that impacts will be bounded. Instead, they would have the flexibility to address any unbounded environmental impacts closer to, but prior to, the decommissioning activity being undertaken that could cause the unbounded impact. If a licensee were to consider a proposed decommissioning activity that would otherwise be prohibited by § 50.82(a)(6)(ii) or § 52.110(f)(2), then prior to undertaking such activity, the licensee could submit a request for a license amendment or a regulatory exemption, decide not to perform the proposed activity, or modify the proposed activity so that the significant environmental impact does not occur. If the licensee chose to submit a license amendment or an exemption request, then the request would trigger NRC responsibilities under the applicable environmental statutes.

The NRC also proposes to change the § 50.82(a)(4)(i) and § 52.110(d)(1) regulations to allow licensees to use appropriate federally issued environmental review documents prepared in compliance with NEPA, ESA, NHPA, or other environmental statutes instead of only environmental impact statements. This change allows licensees to use a wider range of site-specific documents that address various resources. The NRC is also proposing to change the § 50.82(a)(6)(ii) and § 52.110(f)(2) regulations to clarify that the previous review of any potential significant environmental impact must be bounded by appropriate federally issued environmental review documents prepared in compliance with NEPA, ESA, NHPA, or other environmental statutes.

---

### 4.8.3 Assumptions

The regulatory analysis has made the following assumption:

- For Alternative ENV-2, assume that industry will no longer make the effort that they would have taken in status quo to conclude in the PSDAR that all environmental impacts associated with site-specific decommissioning activities will be bounded by previous environmental impact statements.
- Assume that industry would spend three hours per page to conclude in the PSDAR that all environmental impacts associated with site-specific decommissioning activities will be bounded by previous environmental impact statements.

### 4.8.4 Affected Attributes

Industry Implementation: For Alternative ENV-2, industry would avert time that they would take to conclude in the PSDAR that all environmental impacts associated with site-specific decommissioning activities will be bounded by previous environmental impact statements. For Alternative ENV-2 the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

NRC Implementation: For Alternative ENV-2, the NRC would expend resources to implement the proposed and final rulemaking.

Other Government: For Alternative ENV-2, the state and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: For Alternative ENV-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

Environmental: Under Alternative ENV-2, one of the suggested changes would amend the rule language to state that at the PSDAR stage, licensees must evaluate the environmental impacts associated with site-specific decommissioning activities and determine whether they are bounded by previously issued federal environmental documents. This change would clarify the requirement that ensure that the licensee does not perform decommissioning activities that would result in significant impacts not previously reviewed. This regulatory change would have no impact on the NRC, and licensees could continue to resolve any unbounded impacts before the performance of the associated decommissioning activity by requesting a license amendment or an exemption, by not performing the activity, or by modifying the activity to avoid causing the significant environmental impact. Further, this change would more closely align the licensee's environmental analysis to the occurrence of the impact. This would reduce the burden on decommissioning licensees at the time of PSDAR submittal because they would no longer need to develop a statement concluding that all of the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate previously issued environmental impact statements.

## 4.9 Record Retention Requirements

The following regulations contain the existing requirements for recordkeeping and record retention at operating nuclear power plants and ISFSIs:

- 
- General Design Criterion 1 of Appendix A to 10 CFR Part 50, “Quality Standards and Records,” requires licensees to retain certain records throughout the life of the unit.
  - Criterion XVII, “Quality Assurance Records,” of Appendix B, “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants,” to 10 CFR Part 50, requires licensees to retain certain records consistent with regulatory requirements for a duration established by the licensees.
  - 10 CFR 50.59(d)(3) and 52.63(b)(2) require licensees to maintain certain records until termination of a license issued under 10 CFR Part 50 or 10 CFR Part 52.
  - 10 CFR 50.71(c) requires licensees to maintain certain records consistent with various elements of the NRC regulations, facility technical specifications, and other licensing bases documents.
  - 10 CFR 72.72(d) requires licensees to duplicate certain records of spent fuel and high-level radioactive waste and store them in a separate location sufficiently remote from the original records so that a single event would not destroy both sets.

Licensees that are transitioning to decommissioning frequently request exemptions from certain parts of these recordkeeping regulations that require the retention of records until termination of the license. Licensees that have previously been granted these exemptions used the justification that, when the associated structures, systems, and components (SSCs) are removed from the licensing basis documents, the SSCs will no longer serve any NRC-regulated function. Therefore, the need to retain the records will be eliminated.

In addition, several licensees have requested an exemption from the requirements of 10 CFR 72.72(d), which mandates that certain records of spent fuel and high-level radioactive waste in storage be kept in duplicate in a separate location sufficiently remote from the original records that a single event would not destroy both sets of records. Licensees seeking this exemption use the justification that they will store the ISFSI spent fuel records using the same procedures and processes used for the facility spent fuel (and other) records, which are typically stored in accordance with the NRC-approved quality assurance program (QAP).

#### **4.9.1 Alternative R-1 (No-Action)**

The no-action alternative would retain the status quo and all provisions of the current recordkeeping and record retention regulations found in 10 CFR 50.71(c); 10 CFR Part 50, Appendix A, General Design Criterion 1; 10 CFR Part 50, Appendix B, Criterion XVII; 10 CFR 50.59(d)(3), and 10 CFR 72.72(d). Under this alternative, decommissioning licensees would still need to apply for exemptions under 10 CFR 50.12 and 10 CFR 72.7 to remove the record retention requirements for SSCs that no longer serve any NRC-regulated function. The NRC would continue to review and approve these exemptions on a case-by-case basis.

#### **4.9.2 Alternative R-2 (Rulemaking to Decrease Record Retention Requirements during Decommissioning)**

Through this rulemaking effort, the NRC will seek to change the NRC regulations to minimize the need for regulatory exemptions related to recordkeeping and record retention requirements

---

during decommissioning. Once the NRC receives notifications of permanent cessation of operation and permanent removal of fuel from the reactor vessel, under 10 CFR 50.82(a)(1)(i) and 10 CFR 50.82(a)(1)(ii), it will allow decommissioning licensees to eliminate records associated with SSCs that no longer serve any NRC-regulated function. The NRC will allow this change as long as appropriate change mechanisms, such as the 10 CFR 50.59 evaluation process or NRC-approved technical specification changes, are used to assess the removal of those records to determine that elimination of the records will have no adverse impact to public health and safety.

### **4.9.3 Assumptions**

The regulatory analysis assumes that a licensee will request exemptions from certain parts of record keeping regulations at the time it certifies under 10 CFR 50.82(a)(1) or 10 CFR 52.110(a) that it has: (1) permanently ceased operation and (2) permanently removed fuel from the reactor vessel. The NRC also assumes that in the future, the industry, the states and the general public will provide comments on Alternative R-2 during the proposed rulemaking stage.

### **4.9.4 Affected Attributes**

Industry Implementation: Under Alternative R-2, the exemptions that licensees typically submit from record keeping requirements would be reduced, resulting in a one-time benefit (i.e., averted cost) to industry for licensees that enter decommissioning after issuance of the rule. For Alternative R-2, the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

NRC Implementation: For Alternative R-2, the NRC would incur a one-time cost in order to develop the rule. For Alternative R-2, the exemptions from record keeping requirements would be reduced, which would result in a benefit (i.e., averted cost) to the NRC due to lack of reviewing these exemption requests.

Other Government: Under Alternative R-2, the state and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: Under Alternative R-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

## **4.10 Low-Level Waste Transportation**

10 CFR Part 20, "Standards for Protection Against Radiation," Appendix G, "Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifests," Section III.E, contains requirements for investigating rail shipments of low-level radioactive wastes (LLW) if the shipper has not received notification of receipt within 20 days after transfer. In addition, Section III.E requires licensees to report such missing shipments to the NRC. Licensees that are involved in the decommissioning process frequently request an exemption from certain parts of these requirements related to the 20-day receipt notification window. Licensees that have previously been granted these exemptions typically extended the investigation notification window to 45 days using the justification that operational experience indicates that while the 20-day receipt notification window is adequate for waste shipments by truck, rail shipments may take more than 20 days to reach their destination

---

resulting from delays in the route that are outside the licensee's control (e.g., rail cars waiting in switchyards waiting to be included in a train to the disposal facility).

The NRC is proposing this rulemaking to minimize the need for licensees to seek exemptions from the investigation requirements for LLW by extending the receipt of notification period from 20 days to 45 days after transferring LLW from an operating or decommissioning facility by rail, as required by 10 CFR Part 20.

#### **4.10.1 Alternative TR-1 (No-Action)**

The no-action alternative would retain the status quo and all provisions of the current investigation requirements for LLW transportation in 10 CFR Part 20, Appendix G, Section III.E. Under this alternative, both operating and decommissioning licensees would still need to apply for exemptions under 10 CFR 20.2301 in order to extend the receipt notification window to 45 days after transferring LLW from decommissioning nuclear plants by rail. The NRC would continue to review and approve these exemptions on a case-by-case basis.

#### **4.10.2 Alternative TR-2 (Rulemaking to Change Low Level Waste Transportation Requirements)**

Through this rulemaking effort, the NRC will seek to change its regulations to minimize the need for regulatory exemptions related to investigation requirements for LLW transportation during both operation and decommissioning at all nuclear facilities under 10 CFR Part 20. Specifically, the NRC will allow these licensees to extend the receipt notification window to 45 days after transferring LLW from the nuclear facility by rail. This change will continue to meet the underlying purpose of 10 CFR Part 20, Appendix G, Section III.E, which requires licensees to investigate, trace, and report radioactive shipments that have not reached their destination, for unknown reasons.

#### **4.10.3 Assumptions**

The regulatory analysis assumes that a licensee will request exemptions from certain parts of transportation investigation requirements at the time it certifies under 10 CFR 50.82 that it has: (1) permanently ceased operation and (2) permanently removed fuel from the reactor vessel. The regulatory analysis also assumes that in the future, the industry, the states and the general public will provide comments on Alternative TR-2 during the proposed rulemaking stage.

#### **4.10.4 Affected Attributes**

Industry Implementation: Under Alternative TR-2, the exemptions that licensees typically submit from transportation investigation requirements would be reduced, resulting in a one-time benefit (i.e., averted cost) to industry for licensees that enter decommissioning after issuance of the rule. For Alternative TR-2, the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

NRC Implementation: For Alternative TR-2, the NRC would incur a one-time cost in order to develop the rule. For Alternative TR-2, the exemptions from transportation investigation requirements would be reduced, which would result in a benefit (i.e., averted cost) to the NRC due to lack of reviewing these exemption requests.

---

Other Government: Under Alternative TR-2, the state and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: Under Alternative TR-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

#### **4.11 Spent Fuel Management Planning**

The regulation in § 72.218(a) states that the § 50.54(bb) spent fuel management program (i.e., the irradiated fuel management program or IFMP) must include a plan for removing from the reactor site the spent fuel stored under the 10 CFR Part 72 general license. The IFMP must show how the spent fuel will be managed before starting to decommission systems and components needed for moving, unloading, and shipping this spent fuel. Section 72.218(b) requires that an application for termination of a reactor operating license submitted under § 50.82 or § 52.110 must also describe how the spent fuel stored under the 10 CFR Part 72 general license will be removed from the reactor site. Although § 72.218 states what information the § 50.54(bb) IFMP, the § 50.82 and § 52.110 application for termination of a reactor operating license must include, the regulations in §§ 50.54(bb), 50.82, and 52.110 do not contain this information.

As §§ 50.54(bb), 50.82, and 52.110 do not reflect the provisions in § 72.218, this causes regulatory uncertainty. The NRC proposes to clarify and align the regulations in §§ 50.54(bb), 50.82, 52.110, and 72.218 to provide regulatory clarity and enhance overall regulatory transparency and openness regarding decommissioning and spent fuel management planning.

##### **4.11.1 Alternative SFM-1 (No-Action)**

The no-action alternative would retain the provisions of the current decommissioning regulations and guidance documents related to spent fuel management and handling capabilities during decommissioning, and would make no changes or clarifications to the requirements in 10 CFR 50.82, 10 CFR 50.54(bb), 10 CFR 52.110, or 10 CFR 72.218.

##### **4.11.2 Alternative SFM-2 (Rulemaking to clarify and update Spent Fuel Management Planning)**

In this alternative, the NRC would pursue rulemaking to clarify and update the regulations in 10 CFR 50.82, 10 CFR 50.54(bb), 10 CFR 52.110, and 10 CFR 72.218 as they relate to requirements for a licensee to consider or plan how it is going to manage and remove spent fuel at the site before it decommissions the SSCs that support moving, unloading, and shipping of spent fuel. Specifically, 10 CFR 50.54(bb) would be modified to make it clear that the licensee must submit the IFMP before it starts to decommission systems and components needed for moving, unloading, and shipping the spent fuel. In addition, the NRC would align the regulatory process for the IFMP and PSDAR by removing the current preliminary and final approval aspects of the IFMP, and extending the PSDAR public notification, comment, and meeting process to the IFMP. The NRC would also delete the current provisions from 10 CFR 72.218 when it adds these spent fuel management planning requirements to 10 CFR Part 50. In addition, the NRC would revise 10 CFR 72.218 to address requirements related to termination of the 10 CFR Part 72 general license and clarify that the general license ISFSI is decommissioned consistent with the requirements in 50.82 or 52.110, and the general license is



---

terminated upon termination of the 10 CFR Part 50 or 10 CFR Part 52 license. The rulemaking changes would also include development of guidance documents per Alternative SFM-2.

#### **4.11.3 Assumptions**

The regulatory analysis has made the following assumptions:

- Assume that no new regulatory guidance would be developed and that only guidance documents RG 1.184 and 1.185 would be updated to account for spent fuel management requirements.

#### **4.11.4 Affected Attributes**

Industry Implementation: Under Alternative SFM-2, licensees would commit additional resources to respond to the updates to RG 1.184, "Decommissioning of Nuclear Power Reactors" and RG 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report." Under Alternative SFM-2, licensees would commit minor resources to include additional details regarding spent fuel management in the IFMP. For Alternative SFM-2, the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

Industry Operation: Under Alternative SFM-2, licensees would spend less time on conference calls due to enhanced clarity in guidance and/or rulemaking.

NRC Implementation: Under Alternative SFM-2, the NRC would commit additional resources to update RG 1.184 and RG 1.185. For Alternative SFM-2, the NRC would expend resources to implement the rulemaking.

NRC Operation: Under Alternative SFM-2, the NRC would spend less time on conference calls due to enhanced clarity in guidance and/or rulemaking.

Other Government: Under Alternative SFM-2, the state and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

General Public: Under Alternative SFM-2, the general public would commit additional resources to participate in the public meeting and comment period for the proposed rule.

#### **4.12 Backfit Rule**

The NRC uses its backfitting process to decide whether to impose new or revised regulatory requirements or staff positions on nuclear power reactor licensees or certain nuclear materials licensees. To ensure that these proposed changes are adequately defined and justified, the NRC imposes the changes only after a formal and systematic assessment of the proposed imposition. The intended result of the backfitting process is to prevent the NRC, after issuing a license or other approval, from arbitrarily changing the terms and conditions for operating under the approval and the regulations that existed at the time the NRC issued the approval.

For nuclear power reactor licensees, this process is set forth in 10 CFR 50.109, "Backfitting," and in the issue finality provisions in 10 CFR Part 52 (hereinafter collectively referred to as the "Backfit Rule"). The language of the Backfit Rule clearly applies to a licensee designing,

---

constructing, or operating a nuclear power facility. For example, 10 CFR 50.109(a)(1) defines “backfitting” as:

[T]he modification of or addition to systems, structures, components, or design of a facility; or the design approval or manufacturing license for a facility; or the procedures or organization required to design, construct or operate a facility; any of which may result from a new or amended provision in the Commission’s regulations or the imposition of a regulatory staff position interpreting the Commission’s regulations that is either new or different from a previously applicable staff position.

The application of the Backfit Rule to decommissioning plants is not as clear. In SECY-98-253, “Applicability of Plant-Specific Backfit Requirements to Plants Undergoing Decommissioning” (ADAMS Accession No. ML992870107), the NRC presented the Commission with a list of reasons underlying this uncertainty:

- The Backfit Rule has no end point when the rule no longer applies, “thereby implying that backfit protection continues into decommissioning and up to the point of license termination.”
- The term “operate” could reasonably be interpreted as including activities to decommission the reactor.
- The Backfit Rule was developed when the decommissioning of plants was not an active area of regulatory concern.
- The Backfit Rule’s definition of “backfitting” uses terms associated with the design, construction and operation of a facility, rather than its decommissioning, although the staff noted in SECY-98-253 that “prior to the 1996 decommissioning rule, the Commission regarded decommissioning as a phase of the plant’s life cycle which is different from the operational phase.”
- Two of the factors used in evaluating a backfit—costs of construction delay/facility downtime, and changes in plant/operational complexity – are targeted to power operation and “conceptually inappropriate in evaluating the impacts of a backfit on a decommissioning plant.”
- The statement of considerations for the 1970<sup>3</sup>, 1985<sup>4</sup>, and 1988<sup>5</sup> final Backfit Rules did not discuss any aspect of decommissioning, focusing instead on construction and operation.
- Proposed changes to decommissioning requirements usually focused on relaxing requirements or on whether a requirement applicable to an operating reactor continued to be applicable to a decommissioning plant. Thus, “the notion of a ‘substantial increase’ in protection to public health and safety from a backfit does not appear to be particularly useful [in decommissioning].”

---

<sup>3</sup> 35 FR 5317, March 31, 1970

<sup>4</sup> 50 FR 38097, September 20, 1985

<sup>5</sup> 53 FR 20603, June 6, 1988

- 
- The 1996 decommissioning final rule<sup>6</sup> did not directly respond to questions from the public on the applicability of the Backfit Rule to a decommissioning plant.

In SECY-98-253, the NRC staff requested Commission approval to amend, among other regulations, 10 CFR 50.109, so that the Backfit Rule would clearly apply to licensees in decommissioning. In this paper, the NRC staff also proposed that, until the rulemaking was finished, the staff would apply the Backfit Rule to plants undergoing decommissioning “to the extent practical.” In the February 12, 1999 SRM for SECY-98-253 (ADAMS Accession No. ML003753746), the Commission approved development of a Backfit Rule for plants undergoing decommissioning. The Commission directed the NRC staff to continue to apply the then-current Backfit Rule to plants undergoing decommissioning until issuance of the final rule.

The NRC recognizes that certain provisions of the Backfit Rule do not apply to power reactor licensees in decommissioning as discussed in the proposed rule *Federal Register* notice. Currently, the Backfit Rule guidance in Management Directive 8.4, “Management of Facility-Specific Backfitting and Information Collection,” (Ref. 35) provides only that the Backfit Rule applies to decommissioning plants. However, because of the lack of clarity for backfitting in the decommissioning phase of a power reactor, the NRC is proposing rulemaking.

#### **4.12.1 Alternative B-1 (No-action alternative)**

The NRC would continue to apply the Backfit Rule to licensees in decommissioning “to the extent practical.” This means that the NRC would not use the provisions of the Backfit Rule that concern reactors that are being designed, constructed, or operated because those provisions cannot be applied to a licensee of a reactor that has already terminated the design, construction, and operation phases of its reactor’s life. These provisions are, in part or in whole, the following sections of 10 CFR 50.109:

- 10 CFR 50.109(c)(5): Installation and continuing costs associated with the backfit, including the cost of facility downtime or the cost of construction delay;
- 10 CFR 50.109(c)(6): The potential safety impact of changes in plant or operational complexity, including the relationship to proposed and existing regulatory requirements; and
- Other references to reactor design, construction, or operation in 10 CFR 50.109.

This approach would require the NRC to refrain from applying certain provisions of the Backfit Rule to licensees in decommissioning if the NRC determines that the provisions cannot be practically applied to those licensees. The NRC would employ this process on a case-by-case basis, given the specific circumstances at a particular licensee’s site. This approach could undermine the Backfit Rule’s predictability and stability policies because of its case-by-case nature and resultant uncertainty in terms of applicability.

---

<sup>6</sup> 61 FR 39278, July 29, 1996

---

#### **4.12.2 Alternative B-2 (Conduct rulemaking to clarify how the NRC applies the Backfit Rule to licensees in decommissioning)**

The NRC proposes to amend 10 CFR 50.109 so that power reactor licensees, which have had their § 50.82(a)(1) or § 52.110(a) certifications docketed by the NRC, are the subject of similar backfitting provisions as they were during their operating phase. A new backfitting provision for licensees in decommissioning would eliminate any confusion with the meaning of the words, “operate a facility,” in 10 CFR 50.109(a)(1) as compared to other uses of the term “operate” in 10 CFR Chapter I. The current 10 CFR 50.109(a) would be limited to licensees operating reactors, and the new provision would be limited to licensees in decommissioning.

#### **4.12.3 Affected Attributes**

Industry Implementation: To implement Alternative B-2, industry would participate in the development of the rulemaking. These would result in a one time cost to industry for time spent on the reviews and participation in public meetings. For Alternative B-2, the industry would commit additional resources to participate in the public meeting and comment period for the proposed rule.

NRC Implementation: To implement Alternative B-3, the NRC incurs a one-time cost relative to the status quo for developing and finalizing the rule.

Other Government: Under Alternative B-2, the state and local governments would commit additional resources to participate in the public meeting and comment period for the proposed rule.

#### **4.13 Foreign Ownership, Control, or Domination (FOCD)**

The NRC’s regulations in Part 50 and 52 provide for the issuance of a Part 50 license for a utilization or a production facility and a Part 52 license for a utilization facility, respectively. The NRC is proposing to amend its regulations to address the circumstances when a facility licensed under Part 50 or 52 no longer meets the definition of a utilization facility or a production facility, yet the NRC still maintains its regulatory authority over the licensee. The AEA has certain requirements specific to utilization or production facilities. By clarifying when a Part 50 or 52 licensed facility is no longer a utilization or a production facility, the NRC can then specify whether these AEA requirements still apply to the licensee for that facility.

The NRC has identified that 10 CFR 50.38 should not apply to a facility that is no longer a utilization or a production facility. Specifically, the AEA prohibits the issuance of a license for a utilization or a production facility to an entity that the Commission knows or has reason to believe is foreign owned, controlled, or dominated. However, the Commission’s regulations that implement this prohibition in § 50.38 are unclear as to whether the prohibition also applies to the acquisition of a Part 50 or 52 license for a facility that is no longer a utilization or a production facility.

#### **4.13.1 Alternative F-1 (No Action)**

The no-action alternative would retain the NRC’s current regulations regarding utilization and production facilities.

---

The no-action alternative would also retain the provisions of the current decommissioning regulations with regard to the NRC's prohibition on transferring a license to an entity that the Commission knows or has reason to believe is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

#### **4.13.2 Alternative F-2 (Rulemaking to specify FOCD)**

In this alternative, the NRC proposes to add to its regulations language to establish the criteria for when a facility licensed under Part 50 or 52 no longer meets the statutory or regulatory definition of a utilization or a production facility (i.e., is no longer capable of making use of special nuclear material or of the production of special nuclear material, separation of the isotopes of plutonium, or processing of irradiated materials containing special nuclear material, respectively). The first criterion is that the facility must not be legally capable of operating. The second criterion is the physical modification of the licensed facility to be incapable of making use of special nuclear material or of the production of special nuclear material, separation of the isotopes of plutonium, or processing of irradiated materials containing special nuclear material, without significant facility alterations necessary to restore the capability to make use of special nuclear material or produce special nuclear material, separate the isotopes of plutonium, or process irradiated materials containing special nuclear material, respectively. When a utilization facility is physically modified to be incapable of making use of special nuclear material, it is no longer designed or used to sustain nuclear fission in a self-supporting chain reaction.

Sections 50.82(a)(2) and 52.110(b) already provide for the first criterion for power reactor licensees. Sections 50.82(a)(2) and 52.110(b) state, respectively, that a Part 50 or 52 license no longer authorize operation of the reactor or emplacement or retention of fuel into the reactor vessel once the NRC has docketed the certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, or when a final legally effective order to permanently cease operations has come into effect. The NRC would amend these regulations to add the second criterion that the facility licensed under Part 50 or 52 is no longer a utilization facility once the licensee modifies the facility to be incapable of making use of special nuclear material without significant facility alterations.

Because the NRC's regulations do not state when a non-power production or utilization facility (NPUF) licensee is no longer authorized to operate (other than at license termination), the NRC proposes to amend § 50.82(b) to add the criteria for when an NPUF is no longer a production or utilization facility. The NRC would renumber current paragraph (b)(6) in 10 CFR 50.82 as paragraph (b)(8) and add new paragraphs (b)(6) and (b)(7). Paragraph (b)(6) would provide that an NPUF or fuel reprocessing plant is not legally capable of operating when the NRC removes the licensee's authority to operate the facility through a license amendment. Licensees typically request a possession-only license amendment first and then submit a decommissioning plan (via a second license amendment request). This proposed rule would offer licensees the option to request only one licensing action—the decommissioning plan license amendment—that also would address the licensee's operating authority, rendering a "possession-only license amendment" unnecessary. The NRC would add new § 50.82(b)(7) and amend § 50.82(a)(2) and § 52.110(b) to affirm the continuation of the NRC's statutory authority over the existing Part 50 or 52 license after the performance of decommissioning activities that lead to the licensed facility no longer meeting the definition of a utilization or a production facility.

The NRC is also proposing to amend § 50.38, "Ineligibility of certain applicants," such that its prohibition on transferring a license to an entity that the Commission knows or has reason to

---

believe is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government, is not applicable if the license is a Part 50 or 52 license for a facility that no longer meets the definition of a utilization or a production facility.

### **4.13.3 Assumptions**

For Alternative F-2 (Rulemaking to specify FOCD) the NRC assumes in this regulatory analysis that one-third of all future nuclear power reactor sites that decommissioning will submit an exemption from § 50.38 if the proposed rule does not go forward. This assumption is based on historical data on past decommissioning sites that did submit an exemption from § 50.38 (Ref. 36).

### **4.13.4 Affected Attributes**

Industry Implementation: Under Alternative F-2, the exemptions that licensees submit from § 50.38 would be eliminated, resulting in a one-time benefit (i.e., averted cost) to industry for licensees that enter decommissioning after issuance of the rule. Also under Alternative F-2, the proposed rule would offer an NPUF the option to request only one licensing action—the decommissioning plan license amendment—that also would address the licensee’s operating authority, rendering a “possession-only license amendment” unnecessary, resulting in a one-time cost benefit for not having to prepare this amendment.

NRC Implementation: For Alternative F-2, the NRC would incur a one-time cost in order to develop the rule. For Alternative F-2, the exemptions from § 50.38 would be eliminated, which would result in a benefit (i.e., averted cost) to the NRC due to lack of reviewing these exemption requests. Under Alternative F-2, the proposed rule would offer the NPUFs the option to request only one licensing action—the decommissioning plan license amendment—that also would address the licensee’s operating authority, rendering a “possession-only license amendment” unnecessary, resulting in a one-time cost benefit to the NRC for not having to review these amendments.

## **4.14 Clarification of Scope of License Termination Plan Requirement**

The Commission’s “Policy Statement on Deferred Plants” (Ref. 37) addresses holders of construction permits who defer or terminate plant construction. Certain COL holders have cited the Policy Statement for authority to request NRC approval to withdraw their combined licenses. The Policy Statement provides that a permit holder can request to withdraw its permit and does not cite to the license termination provisions in 10 CFR Part 50. The Policy Statement was issued prior to the promulgation of 10 CFR Part 52 and has not been updated since, but there is nothing to prevent holders of a combined license from following the applicable parts of the Policy Statement while continuing to comply with the Commission’s regulations and the terms and conditions of the combined license. The requirement for a license termination plan in § 52.110(i) does not apply to plants that have not begun operating. While § 52.110(i) does refer to “[a]ll power reactor licensees,” the regulatory history and context indicates that § 52.110 as a whole applies only to plants that have started operation

### **4.14.1 Alternative T-1 (No-Action)**

The no-action alternative would retain the provisions of the current decommissioning regulations with regard to the requirement for a license termination plan in § 50.82(a)(9) and § 52.110(i).

---

#### **4.14.2 Alternative T-2 (Rulemaking to clarify license termination plan)**

The NRC is proposing to amend its regulations to clarify that the requirement for a license termination plan in § 50.82(a)(9) and § 52.110(i) applies only to power reactor licensees that commenced operation. This clarification is being proposed in response to apparent confusion among combined license holders who seek to surrender their licenses before operation. However, to avoid confusion over the license termination plan requirement, the NRC proposes to amend § 52.110(i) so that it explicitly applies only to “power reactor licensees that commenced operation.” As stated in the “Final Procedures for Conducting Hearings on Conformance With the Acceptance Criteria in Combined Licenses” (Ref. 38), the NRC has historically understood operation as beginning with the loading of fuel into the reactor. Therefore, § 52.110(i) would apply to 10 CFR Part 52 power reactor licensees that have, at a minimum, begun to load fuel into the reactor. Section 50.82(a)(9) would apply to 10 CFR Part 50 power reactor licensees that, at a minimum, have begun to load fuel into the reactor.

#### **4.14.3 Assumptions**

For Alternative T-2 (Rulemaking to clarify license termination plan) this clarification is administrative and does not present a significant change in the costs and benefits for the industry, NRC, State and local governments and the general public.

### **5 EVALUATION OF COSTS AND BENEFITS FOR AREAS OF DECOMMISSIONING CONSIDERED FOR RULEMAKING**

This section examines the costs and benefits expected to result from the alternatives of the decommissioning areas relative to the regulatory baseline (i.e. the no-action alternative). All costs and benefits are monetized, when possible. The total of costs and benefits are then summed to determine whether the difference between the costs and benefits results in a positive net benefit. Costs and benefits, which are not monetized because of the lack of data, are qualitatively described.

#### **5.1 Analytical Methodology**

This section describes the process used to evaluate costs and benefits associated with the alternatives, consistent with the guidance provided in NUREG/BR-0058, “Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission,” Revision 5 (Ref. 39). The benefits include desirable changes in affected attributes (e.g., monetary savings, reduced burden on licensees, streamlined process), while the costs include any undesirable changes in affected attributes (e.g., monetary costs).

This regulatory analysis evaluates eight attributes on a quantitative basis: industry implementation, industry operation, NRC implementation, NRC operation, other government, general public, environmental considerations and regulatory efficiency. Quantitative analysis requires a baseline characterization of the affected universe, including characterization of factors such as the number of affected entities, the areas of decommissioning, and the administrative processes and procedures that licensees or applicants would implement, or no longer implement, because of the alternatives under consideration. Costs to complete and process exemptions and amendments for decommissioning proceeding to preparing the proposed rule in 2018 are sunk costs and are not considered in this regulatory analysis.

---

### 5.1.1 Regulatory Baseline

This regulatory analysis measures the incremental impacts of the recommended rulemaking relative to a baseline that reflects anticipated behavior in the event NRC undertakes no additional regulatory actions (the no-action alternatives). As part of the regulatory baseline used in this analysis, the staff assumes full licensee compliance with existing NRC regulations.

### 5.1.2 Discount Rates

In accordance with guidance from the Office of Management and Budget (OMB) Circular No. A-4, "Regulatory Analysis" (Ref. 40), and NUREG/BR-0058, Revision 5, net present worth calculations are used to determine how much society would need to invest today to ensure that the designated dollar amount is available in a given year in the future. By using present worth values, costs and benefits, regardless of when the cost or benefit is incurred in time, are valued to a reference year for comparison. Based on OMB Circular No. A-4 and consistent with NRC past practice and guidance, present worth calculations are presented using 3-percent and 7-percent real discount rates.<sup>7</sup> A 3-percent discount rate approximates the real rate of return on long-term government debt, which serves as a proxy for the real rate of return on savings to reflect reliance on a social rate of time preference discounting concept. A 7-percent discount rate approximates the marginal pretax real rate of return on an average investment in the private sector, and is the appropriate discount rate whenever the main effect of a regulation is to displace or alter the use of capital in the private sector. A 7-percent rate is consistent with an opportunity cost of capital<sup>8</sup> concept to reflect the time value of resources directed to meet regulatory requirements.

### 5.1.3 Cost/Benefit Inflation

To evaluate the costs and benefits consistently, the analysis inputs are inflated into 2018 dollars. The most common inflator is the Consumer Price Index for all urban consumers (CPI-U), developed by the U.S. Department of Labor, Bureau of Labor Statistics (BLS). The formula to determine the amount in 2018 dollars is as follows:

$$\frac{\text{CPIU}_{2018}}{\text{CPIU}_{\text{Value Year}}} * \text{Value}_{\text{Value Year}} = \text{Value}_{2018}$$

Values of CPI-U used in this cost-benefit analysis are summarized in [Table 5](#).

---

<sup>7</sup> The rates presented in Appendix C to OMB Circular No. A-94 (Ref. 41) do not apply to regulatory analysis or cost-benefit analysis of public investment. These rates are used for lease-purchase and cost-effectiveness analysis, as specified in the Circular.

<sup>8</sup> Opportunity cost is the value of the next best alternative to a particular activity or resource. An analyst does not need to assess opportunity cost in monetary terms. Opportunity cost can be assessed in terms of anything that is of value.



Table 5 Consumer Price Index—All Urban Consumers, U.S. City Average

Base Year	CPI-U Annual Average <sup>a</sup>	Forecast Percent Change of CPI-U from Previous Year <sup>b</sup>
2017	245.120	
2018	250.758	2.30%
2019	256.776	2.40%

<sup>a</sup> United States Bureau of Labor Statistics, “Table 24, Historical Consumer Price Index for All Urban Consumers (CPI-U): U.S. City Average, All-Items,” <https://www.bls.gov/cpi/tables/supplemental-files/historical-cpi-u-201802.pdf> (Ref. 42).

<sup>b</sup> United States Congressional Budget Office, “The Budget and Economic Outlook: 2017 to 2027.” Table 2-1, “CBO’s Economic Projections for Calendar Years 2017 to 2027,” January 2017, <https://www.cbo.gov/publication/52370> (Ref. 43).

### 5.1.4 Labor Rates

For regulatory analysis purposes, labor rates are developed and this approach is consistent with guidance set forth in NUREG/CR-4627, “Generic Cost Estimates” (Ref. 44), and general cost-benefit methodology. The NRC labor rate for fiscal year 2018 is \$131 per hour.<sup>9</sup>

The estimated mean industry labor rate is \$141 per hour. The NRC derived these labor rates according to data provided by BLS. The NRC used the 2016 occupational employment and wages data, which provided labor categories and the mean hourly wage rate by job type and used the inflator discussed in Section 5.1.3 to inflate these labor rate data to 2018 dollars. The industry labor rates used in the analysis reflect total compensation, which includes health and retirement benefits (using a burden factor of 2.0). The NRC used the BLS data tables to select appropriate hourly labor rates for performing the estimated procedural, licensing, and utility-related work necessary during and following implementation of the proposed alternatives. In establishing this labor rate, wages paid for the individuals performing the work plus the associated fringe benefit component of labor cost (i.e., the time for plant management over and above those directly expensed) are considered expenses and are included. The NRC also verified that these labor rates are consistent with wage rates submitted by industry in recent severe accident mitigation alternatives cost estimates. Appendix A of this regulatory analysis provides a breakdown of the labor categories considered that may be required to implement rulemaking. The NRC performed an uncertainty analysis, which is discussed in Section 6.10.

### 5.1.5 Affected Entities

The following describes the nuclear power reactors that are affected by the decommissioning rule:

<sup>9</sup> The NRC labor rates presented here differ from those developed under the NRC’s license fee recovery program (10 CFR Part 170, “Fees for Facilities, Materials, Import and Export Licenses, and Other Regulatory Services under the Atomic Energy Act of 1954, as Amended”). The NRC labor rates for fee recovery purposes are set for cost recovery of the services rendered and, as such, include non-incremental costs (e.g., overhead, administrative, and logistical support costs).

---

Operating reactor sites: The NRC models 66 U.S. light-water nuclear power reactors sites in this analysis.<sup>10</sup> Note that in 2013 three of these sites had permanently shut down without significant advance notice or preplanning. These sites are Crystal River Nuclear Generation Plant, Kewaunee Nuclear Power Station and San Onofre Nuclear Generating Station. On December 29, 2014, Entergy Nuclear Operations, Inc., shut down Vermont Yankee Nuclear Power Station. Furthermore, the Omaha Public Power District board of directors shut down Fort Calhoun Station on October 24, 2016 (Ref. 45).

The following licensees have announced plans to shut down their operation power reactor sites between 2018 and 2025:

- Oyster Creek – by October 31, 2018 (originally by December 31, 2019)
- Pilgrim – by June 1, 2019
- Three Mile Island Unit 1 – on or about September 30, 2019
- Davis-Besse – by May 31, 2020
- Indian Point – by April 30, 2021
- Perry – by May 31, 2021
- Beaver Valley – by October 31, 2021
- Palisades – by spring 2022 (originally planned to shut down in 2018)
- Diablo Canyon – ~~in~~by 2025

These licensees who have identified their intention to permanently cease operations in the near future have indicated that they plan to continue to use the current transition process (i.e., establishing a decommissioning regulatory framework by requesting exemptions, license amendments, and rescinding orders, as needed). The NRC assumes that these licensees will not wait for the outcome of the decommissioning rulemaking before formulating their decommissioning licensing activities.

- Future operating reactor units: The NRC assumes that there are two future operating light-water nuclear power reactors that would be affected by the recommended rule and are considered in this analysis. The future nuclear power reactor units are Vogtle Electric Generating Plant, Units 3 and 4, assumed to begin operations in 2021 and 2022, respectively.<sup>11</sup>
- Non-power production or utilization facility (NPUF): The proposed rule will affect all NPUFs with respect to the definition of a production or utilization facility. Here the NRC would amend regulations to add the first criterion for NPUFs and fuel reprocessing plants (i.e., the licensee is no longer authorized to operate) and the second criterion for all production or utilization facilities that the facility licensed under Part 50 or 52 is no longer a utilization facility once the licensee modifies the facility to be incapable of making use of special nuclear material without significant facility alterations. The NRC is also proposing to amend § 50.38 such that its prohibition on transferring a license to an entity that the Commission knows or has reason to believe is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government, is not applicable if

---

<sup>10</sup> Based on information obtained from NUREG-1350, Volume 29, "Information Digest: 2017–2018," Appendix G, "U.S. Commercial Nuclear Power Reactor Operating Licenses—Expiration by Year, 2013–2049," issued August 2017.

<sup>11</sup> Fermi Unit 3, Levy County Units 1 and 2, South Texas Project Units 3 and 4 and William State Lee III Units 1 and 2 are not included in this analysis because as of 11/1/2016, the NRC issued a COL for these proposed new reactors but the licensees have no immediate plans to begin construction. If the construction plans change during this rulemaking, the regulatory analysis will be revised.

---

the license is a Part 50 or 52 license for a facility that no longer meets the definition of a utilization or a production facility.

Other potential new reactors licensed under 10 CFR Part 52 and small modular reactors are not included in this analysis. In the case that additional 10 CFR Part 52 applicants are issued licenses and are under construction, the regulatory analysis for the final rule will reflect that change.

### **5.1.6 Sign Conventions**

The sign conventions used in this analysis for all favorable consequences for the alternatives are positive and all adverse consequences for the alternatives are negative. For example, additional costs above the regulatory baseline are shown as negative values, and benefits and averted costs are shown as positive values. Negative values are shown using parentheses (e.g., negative \$500 is displayed as (\$500)).

### **5.1.7 Base Year**

The rulemaking is expected to be issued and effective in 2020. The monetized benefits and costs in this analysis are expressed in year 2018 dollars. Rulemaking-related implementation costs are assumed to be incurred in years 2018 and 2019. Non-rulemaking implementation costs are assumed to be incurred in year 2020. Ongoing and annual costs of operation related to the alternatives are assumed to begin in year 2021 unless otherwise stated and continue until no additional costs or benefits are incurred. These monetized future costs and benefits are then discounted back into year 2018 dollars.

### **5.1.8 Time Period of Analysis**

To define the period of analysis covered by this regulatory analysis (i.e., the period over which costs and benefits would be incurred), the NRC used the remaining license term for each operating and COL licensees. These remaining license terms were obtained from NUREG-1350 (Ref. 46). The license terms consist of an operating period and can be followed by a 60 year period for SAFSTOR or a 12.5 year period for DECON decommissioning. The NRC assumes that each operating site that has not renewed its license will apply for and receives one 20-year license renewal beyond the original 40-year license term. At the end of the operating period, the NRC assumes that each site would enter the decommissioning phase, and would in turn incur decommissioning site costs. There are two new reactors included in the analysis - Vogtle Units 3 and 4. The NRC assumes that both new reactors will apply for and receive one 20-year license renewal in addition to the original 40-year license. Based on these assumptions, the Vogtle nuclear site would incur costs associated with the final rule from 2020 through 2082.

### **5.1.9 Cost Estimation**

In order to estimate the costs associated with the evaluated alternatives, the NRC used a work breakdown structure approach to deconstruct each alternative into requirements that would need to be met. These requirements include avoidance of exemptions and/or amendments, additional processes that licensees would be required to complete (e.g., additional materials and drug testing) and other additional penalties (e.g., spent fuel management fees). Additionally, licensee input on reduced staffing during decommissioning and extrapolation

---

techniques (i.e., utilization of cost factors) was used to estimate the costs and benefits of each alternative.

The NRC gathered data from several sources (e.g., BLS, internal databases, publications, and periodicals) and professional opinion. This data was used to estimate activities such as the levels of effort required to prepare and submit exemption requests and license amendments, to review and process the exemptions and license amendments, to manage and track spent fuel management costs, and to complete materials tests. NRC working group members were also consulted to obtain expert opinion on the levels of effort (labor hours and staffing) to complete decommissioning activities. This expert opinion is based on NRC experience with oversight of operating and decommissioning power reactors and forms the basis for the many assumptions used to derive the cost estimates. In addition, the NRC used historical cost data to estimate the future cost of some requirements (e.g., drug and alcohol testing) using cost factors. For instance, to calculate the estimated averted costs of requests for exemptions and amendments and the preparation of the final rule, it was necessary for the NRC to extrapolate the labor hours responsible for the work based on past data. For steps in the regulatory alternatives with no or incomplete data, the staff based its cost estimates on similar steps for which data are available.

To incorporate uncertainty into the model, the staff employed a Monte Carlo simulation, which is an approach to uncertainty analysis where input variables are expressed as distributions. The simulation was run 10,000 times, and values used in simulations were chosen randomly from the distributions of the input variables provided in Appendix B to this document. The result was a distribution of values for the output variable of interest. Using Monte Carlo simulation, it is also possible to determine the input variables that have the greatest effect on the value of the output variable. Section 6.10 of this analysis provides a description of the Monte Carlo simulation methods and a presentation of the uncertainty analysis.

## **6 PRESENTATION OF RESULTS FOR AREAS OF DECOMMISSIONING CONSIDERED FOR RULEMAKING**

This section presents the quantitative and qualitative results by attribute relative to the regulatory baseline. As described in the previous sections, costs and benefits are quantified where possible and can have either a positive or a negative algebraic sign, depending on whether the alternative has a favorable or adverse effect relative to the regulatory baseline (Alternative 1). A discussion is provided for those attributes that could not be represented in monetary values. Although this *ex ante* cost-benefit analysis<sup>12</sup> provides useful information that can be used when deciding whether to select an alternative, the analysis is based on estimates of the future costs and benefits. Whether the estimates hold in the future, the process of conducting regulatory analyses has value in that it helps decision makers think in depth about specific alternatives and their associated results.

### **6.1 Industry Implementation**

The NRC estimates that amending some of the requirements in 10 CFR Part 50 that were mentioned previously (e.g., EP, physical security) would allow licensees to avert one-time costs because they would submit fewer exemptions and license amendment requests. However, the NRC had introduced new requirements for licensees which would result in additional costs.

---

<sup>12</sup> An *ex ante* cost-benefit analysis is prepared before a policy, program, or alternative is in place and can assist in the decision about whether resources should be allocated to that alternative.

---

Discussion of both the averted and additional costs of each area of decommissioning is presented in the next two sections.

### **6.1.1 Averted Industry Implementation Costs**

The licensee submittal of an exemption or amendment request to the NRC can be expensive. In order to be exempt from, or to change how a licensee complies with the NRC's requirements (e.g., maintaining offsite emergency preparedness, using DTFs for spent fuel management, etc.) during its reactor's decommissioning phase, the licensee must submit an exemption request or a license amendment request to the NRC for review and approval. This analysis evaluates the alternatives for proposed rulemaking in multiple areas of decommissioning, which will eliminate the need for decommissioning-related exemption and license amendment requests. These alternatives and areas of decommissioning are as follows:

- Under Alternative EP-2, exemptions from EP requirements and amendments to licensees regarding changes to the emergency plans would be reduced. This would result in a one-time benefit (i.e., averted cost) to industry from writing fewer exemption and amendment requests.
- Under Alternative PS-2, licensees would not need to apply for exemptions from the physical security requirements for suspension of security measures for the control room and ISFSI. This would result in a one-time benefit to industry from writing fewer exemptions.
- Under Alternative CS-2, industry would not need to submit an amendment to remove their cyber security plans once the spent fuel has sufficiently decayed.
- Under Alternative CFH-3, licensees would not need to submit for Commission approval fuel handler training programs suitable to qualify CFHs. This would result in a one-time cost benefit to industry.
- Under Alternative DTF-2, licensees would not need to apply for exemptions to use the DTF for spent fuel management. This would result in a one-time cost benefit to industry.
- Under Alternatives FP-2, the exemptions for offsite and onsite financial protection requirements would be fewer due to the reductions in financial protection based on the level of decommissioning. This would result in a one-time benefit (i.e., averted cost) to industry from writing fewer exemptions.
- Under Alternative R-2, exemptions from the recordkeeping and record retention requirements would be reduced. This would result in a one-time benefit (i.e., averted cost) to industry for having to write fewer exemptions pertaining to these requirements.
- Under Alternative TR-2, exemptions related to LLW transportation investigation requirements during both operating and decommissioning at nuclear facilities covered by the requirements of 10 CFR Part 20 would be reduced. This would result in a one-time benefit (i.e., averted cost) to industry for having to write fewer of these exemptions.
- Under Alternative F-2, exemptions that licensees submit from § 50.38 would be eliminated, resulting in a one-time benefit (i.e., averted cost) to industry for licensees that enter decommissioning after issuance of the rule. The proposed rule would offer the

NPUFs the option to request only one licensing action—the decommissioning plan license amendment—that also would address the licensee’s operating authority, rendering a “possession-only license amendment” unnecessary, resulting in a one-time benefit to NPUFs for not having to prepare these amendments.

**Table 6** Table 6 presents the averted implementation costs for all alternatives under proposed rulemaking relative to the no-action alternatives (status quo). Note that the licensees that have already entered decommissioning (i.e., Crystal River, Vermont Yankee, San Onofre, Kewaunee and Fort Calhoun), and those that have submitted an intent to decommission before year 2020 (e.g. Oyster Creek) will not receive the full benefits from the avoidance of the exemption and amendment process during the decommissioning transition phase. This is because these licensees likely will have already submitted exemption or amendment requests to the NRC for processing before the final rulemaking becomes effective in year 2020.

Table 6 Averted Industry Implementation Costs

Areas of Decommissioning	Alternatives	Averted Industry Implementation Costs		
		Undiscounted	7% NPV	3% NPV
Emergency Preparedness	EP-2	\$ 19,855,000	\$ 5,488,000	\$ 10,554,000
Physical Security	PS-2	\$ 3,353,000	\$ 927,000	\$ 1,783,000
Cybersecurity	CS-2	\$ 621,000	\$ 155,000	\$ 299,000
Certified Fuel Handler Training	CFH/STA-2	\$ 657,000	\$ 159,000	\$ 329,000
Decommissioning Funding Assurance	DTF-2	\$ 2,081,000	\$ 575,000	\$ 1,106,000
Offsite & Onsite Financial Protection	FP-2	\$ 1,718,000	\$ 475,000	\$ 913,000
Record Retention Requirements	R-2	\$ 754,000	\$ 209,000	\$ 401,000
Low Level Waste Transportation	TR-2	\$ 567,000	\$ 157,000	\$ 302,000
Foreign Ownership, Control, or Domination	F-2	\$ 204,000	\$ 56,000	\$ 109,000

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars.

\*\*\* NPV = net present value.

### 6.1.2 Additional Industry Implementation Costs

Additional one-time costs to the licensees would result for the following alternatives under proposed rulemaking:

- For Alternative EP-2, licensees would incur an additional one-time cost to participate in the public meeting and comment period for the proposed rule.
- For Alternative PS-2, licensees would incur an additional one-time cost to participate in the public meeting and comment period for the proposed rule.
- For Alternative CS-2, licensees would incur an additional one-time cost to participate in the public meeting and comment period for the proposed rule.
- For Alternative DA-2, licensees would incur an additional one-time cost because licensees would have to modify the drug and alcohol testing procedures in order to comply with the amended regulation. In addition, licensees would incur additional costs by participating in the public meetings and submitting comments on proposed alternatives.
- For Alternative CFH/STA-2, licensees would incur an additional one-time cost to participate in the public meeting and comment period for the proposed rule.

- For Alternative DTF-2 may result in additional costs to those licensees not under rate-setting regulations who report a shortfall in its DTF and are required to report compliance in the next decommissioning report. The cost impacts of the recommend change to make up the shortfall within a timely manner was not modeled at this time. In addition, licensees would incur additional costs by participating in the public meetings and submitting comments on the proposed alternatives.
- For Alternative FP-2, licensees would incur an additional one-time cost to participate in the public meeting and comment period for the proposed rule. Licensees would also incur an additional one-time cost to submit a prompt notification to the Commission of any material change in proof of onsite property insurance filed with the Commission under Part 50 and offsite insurance under Part 140.
- For Alternative ENV-2, licensees would commit additional resources to participate in the public meetings and write comments on the alternatives.
- For Alternative SFM-2, licensees would incur additional costs by participating in the public meetings and submitting comments on the proposed alternatives. Under Alternative SFM-2, licensees would commit additional resources to include the spent fuel management summary in the PSDAR.

**Table 7** Table 7 presents the additional implementation costs for all alternatives under proposed rulemaking relative to the no-action alternatives (status quo). The costs for industry to write and submit comments are included as well for each of the alternatives presented.

Table 7 Additional Industry Implementation Costs

Areas of Decommissioning	Alternatives	Additional Industry Implementation Costs		
		Undiscounted	7% NPV	3% NPV
Emergency Preparedness	EP-2	\$ (25,000)	\$ (25,000)	\$ (25,000)
Physical Security	PS-2	\$ (13,000)	\$ (13,000)	\$ (13,000)
Cybersecurity	CS-2	\$ (4,000)	\$ (4,000)	\$ (4,000)
Drugs and Alcohol Testing	DA-2	\$ (4,000)	\$ (4,000)	\$ (4,000)
Certified Fuel Handler Training	CFH/STA-2	\$ (5,000)	\$ (5,000)	\$ (5,000)
Decommissioning Funding Assurance	DTF-2	\$ (20,000)	\$ (20,000)	\$ (20,000)
Offsite & Onsite Financial Protection	FP-2	\$ (13,000)	\$ (8,000)	\$ (10,000)
Environmental Considerations	ENV-2	\$ (11,000)	\$ (11,000)	\$ (11,000)
Spent Fuel Management Planning	SFM-2	\$ (12,000)	\$ (6,000)	\$ (8,000)
Backfit Rule	B-2	\$ (13,000)	\$ (13,000)	\$ (13,000)

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars.

## 6.2 Industry Operation

This attribute accounts for the projected economic effect caused by routine and recurring activities in the alternatives on affected licensees. The staff estimates that by amending some of the NRC's requirements that were mentioned previously (e.g., EP, physical security, etc.), licensees would be able to avert costs on a recurring basis (annually) during the decommissioning phase. However, the NRC has found that as a result of these changes to the NRC's regulations, licensees for power reactors would also be incurring costs annually during the decommissioning phase. The averted and additional costs that result on a recurring basis, annually or otherwise, are the operation costs. Discussion of the operation costs for each area of decommissioning is presented in the next two sections.

## 6.2.1 Averted and Additional Industry Recurring Costs

Recurring averted costs would result for the following alternatives under proposed rulemaking:

- Under Alternative DA-2, the licensee’s drug and alcohol testing program cost would be reduced for the length of the program during decommissioning due to the reduction individuals subject to the FFD elements necessary to satisfy IMP requirements.
- Under Alternative DTF-2, licensees would expend fewer resources to process decommissioning funding assurance reports because the annual reporting frequencies would be extended from every two years to every three years. The licensees would also avert costs because resubmittals subsequent to the initial decommissioning funding plan for ISFSIs will no longer require NRC approval.
- Under Alternative SFM-2, the proposed rule would result in reduced licensee time in teleconference calls with the NRC due to the clarity in how licensees should manage the spent fuel.
- Under Alternative CS-2, the proposed rule would result in recurring costs to COL licensees because they would be expending additional labor hours to implement the cyber security requirements for 10 months for BWRs and 16 months for PWRs, after the last reactor permanently defuels.

**Table 8** presents the averted and additional industry operation costs for all affected areas of decommissioning relative to the no-action alternatives (status quo). Note that only 57 nuclear power plant sites are accounted for in this attribute, because five sites (i.e., Crystal River, Kewaunee, San Onofre, Vermont Yankee and Ft. Calhoun) have already entered decommissioning and three sites (i.e. Oyster Creek, Pilgrim, and Three Mile Island) will plan to decommission before the rulemaking takes effect. The Bellefonte site is not accounted for in this regulatory analysis due to the fact that construction of this site has ceased and its future remains uncertain.

Table 8 Averted and Additional Industry Operation Costs

Areas of Decommissioning	Alternatives	Averted Industry Operation Costs		
		Undiscounted	7% NPV	3% NPV
Drugs and Alcohol Testing	DA-2	\$ 26,214,000	\$ 6,531,000	\$ 13,211,000
Decommissioning Funding Assurance	DTF-2	\$ 2,020,000	\$ 1,044,000	\$ 1,493,000
Spent Fuel Management Planning	SFM-2	\$ 52,000	\$ 14,000	\$ 28,000
Areas of Decommissioning	Alternatives	Additional Industry Operation Costs		
		Undiscounted	7% NPV	3% NPV
Cybersecurity	CS-2	\$ (1,050,000)	\$ (18,000)	\$ (178,000)

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars

## 6.3 NRC Implementation

By amending the NRC’s requirements that were mentioned previously, the NRC believes that licensees would be able to avert costs expended to apply for exemptions and amendments. As a result, the NRC would avert the cost to process these exemption and amendment requests. However, to achieve these savings, the NRC would incur a cost to develop the final rule and the



associated RGs. The following sections discuss the averted and incurred NRC implementation costs for rulemaking and guidance development.

### 6.3.1 Averted NRC Implementation Costs

When the NRC processes an exemption or license amendment request, resources are expended to perform the review, resolve technical issues, document the evaluation, and respond to the licensee. As a result of this rulemaking, the licensees would submit fewer exemption and license amendment requests and as a result the NRC would avert the time to process these submittals. This would lead to averted costs for the NRC and result in a one-time benefit. Exemption and license amendment requests that were submitted and processed (e.g., Crystal River, Vermont Yankee, San Onofre, and Kewaunee) and those that are expected to be submitted and processed before the effective date of the rule are not included in this analysis. [Table 9](#) displays the NRC averted implementation costs for processing exemption and license amendment requests.

Table 9 Averted NRC Implementation Costs

Areas of Decommissioning	Alternatives	Averted NRC Implementation Costs		
		Undiscounted	7% NPV	3% NPV
Emergency Preparedness	EP-2	\$ 10,726,000	\$ 2,965,000	\$ 5,702,000
Physical Security	PS-2	\$ 2,256,000	\$ 624,000	\$ 1,199,000
Cybersecurity	CS-2	\$ 328,000	\$ 82,000	\$ 158,000
Certified Fuel Handler Training	CFH/STA-2	\$ 1,413,000	\$ 341,000	\$ 708,000
Decommissioning Funding Assurance	DTF-2	\$ 1,119,000	\$ 309,000	\$ 595,000
Offsite & Onsite Financial Protection	FP-2	\$ 977,000	\$ 270,000	\$ 519,000
Record Retention Requirements	R-2	\$ 406,000	\$ 112,000	\$ 216,000
Low Level Waste Transportation	TR-2	\$ 305,000	\$ 84,000	\$ 162,000
Foreign Ownership, Control, or Domination	F-2	\$ 110,000	\$ 30,000	\$ 58,000

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars.

### 6.3.2 Additional NRC Implementation Costs

The decommissioning final rule would impose implementation costs on the NRC. These costs include procedural and administrative activities, responding to public comments, developing the proposed rule and draft guidance documents, and developing and issuing the final rule and guidance documents. These one-time costs include updating NUREG documents and begin in 2018 with the proposed rulemaking and are assumed to end in 2020 with the development and issuance of the final rule. The regulatory analysis does not include estimates to perform ongoing decommissioning licensing activities. [Table 10](#) shows the estimated cost for developing and issuing the proposed rule and associated RGs and NUREGs for each area of decommissioning.

Table 10 Additional NRC Implementation Costs

Areas of Decommissioning	Alternatives	Additional NRC Implementation Costs		
		Undiscounted	7% NPV	3% NPV
Emergency Preparedness	EP-2	\$ (679,000)	\$ (657,000)	\$ (669,000)
Physical Security	PS-2	\$ (679,000)	\$ (657,000)	\$ (669,000)
Cybersecurity	CS-2	\$ (137,000)	\$ (132,000)	\$ (135,000)
Drugs and Alcohol Testing	DA-2	\$ (116,000)	\$ (112,000)	\$ (114,000)
Certified Fuel Handler Training	CFH/STA-2	\$ (126,000)	\$ (122,000)	\$ (124,000)
Decommissioning Funding Assurance	DTF-2	\$ (525,000)	\$ (508,000)	\$ (518,000)
Offsite & Onsite Financial Protection	FP-2	\$ (174,000)	\$ (169,000)	\$ (172,000)
Environmental Considerations	ENV-2	\$ (82,000)	\$ (79,000)	\$ (81,000)
Record Retention Requirements	R-2	\$ (82,000)	\$ (79,000)	\$ (81,000)
Low Level Waste Transportation	TR-2	\$ (82,000)	\$ (79,000)	\$ (81,000)
Spent Fuel Management Planning	SFM-2	\$ (338,000)	\$ (311,000)	\$ (326,000)
Backfit Rule	B-2	\$ (46,000)	\$ (45,000)	\$ (46,000)
Foreign Ownership, Control, or Domination	F-2	\$ (11,000)	\$ (11,000)	\$ (11,000)

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars

## 6.4 NRC Operation

This attribute accounts for the projected economic effect caused by routine and recurring activities in the proposed alternatives by the NRC. The NRC estimates that by improving the regulations governing decommissioning power reactors, there would be additional and averted costs on an annual basis. Costs that are incurred annually are due to the expense of NRC resources to provide oversight. The following areas of decommissioning are affected under proposed rulemaking, where the NRC could avert or save costs on a recurring basis.

- Under Alternative DA-2, the NRC would avert costs for the administration of reporting requirements due to the applicability of drug and alcohol testing on a reduced population at a decommissioning plant.
- Under Alternative DTF-2, the NRC would avert costs due to the review of the decommissioning funding assurance reporting requirements being on a triennial frequency (every 3 years) instead of on a biennial frequency. The NRC would also avert costs because resubmittals subsequent to the initial decommissioning funding plan for ISFSIs will no longer require NRC approval
- Under Alternative SFM-2, the proposed rule would result in reduced NRC time in teleconference calls with the licensees due to the clarity in how licensees should manage the spent fuel.

Table 11 Averted NRC Operation Costs

Areas of Decommissioning	Alternatives	Averted NRC Operation Costs		
		Undiscounted	7% NPV	3% NPV
Drugs and Alcohol Testing	DA-2	\$ 509,000	\$ 127,000	\$ 257,000
Decommissioning Funding Assurance	DTF-2	\$ 1,324,000	\$ 677,000	\$ 973,000
Spent Fuel Management Planning	SFM-2	\$ 28,000	\$ 8,000	\$ 15,000

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars

## 6.5 Regulatory Efficiency

The proposed rulemaking alternatives relative to the regulatory baseline would increase regulatory efficiency for the following areas of decommissioning: Emergency Preparedness, Physical Security, Decommissioning Funding Assurance, and Offsite and Onsite Financial Protection Requirements and Indemnity Agreements. This is because these changes would significantly reduce the number of license amendment and exemption requests that the licensees would need to prepare and submit during the decommissioning transition phase. This would significantly reduce the labor hours required by the licensees to develop and submit the amendment and/or exemption requests to the NRC and by the NRC to review these requests. For all areas of decommissioning, the proposed rulemaking alternatives would add clarity to what licensees can and cannot do during decommissioning and, as a result, would enable the NRC to better maintain and administer regulatory activities over the decommissioning process.

## 6.6 Other Government

All areas of decommissioning considered in this analysis would result in additional burden to other Federal, State and local government agencies because these agencies would commit additional resources to participate in public meetings and submit comments on documents published for public comment.

In Alternative EP-2, Rulemaking to amend regulations to provide a graded approach to emergency preparedness, FEMA must establish a notification process that would replace the existing NRC/FEMA process for terminating the assessment of FEMA user fees following the receipt from the NRC of its approved exemptions from pertinent 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50 requirements. These exemptions would state that offsite radiological emergency planning and preparedness are no longer required at a particular commercial nuclear power plant site after the spent fuel has cooled for a period of 10 months for BWRs or 16 months for PWRs. This change also requires FEMA to perform a rulemaking to amend 44 CFR 354.4(e) to reflect this new process. The following table shows the estimates costs to other government entities.

Table 12 Costs to Other Government Agencies

Areas of Decommissioning	Alternatives	Total Costs (Other Government)		
		Undiscounted	7% NPV	3% NPV
Emergency Preparedness	EP-2	\$ (30,000)	\$ (30,000)	\$ (30,000)
Physical Security	PS-2	\$ (5,000)	\$ (5,000)	\$ (5,000)
Decommissioning Funding Assurance	DTF-2	\$ (12,000)	\$ (12,000)	\$ (12,000)
Offsite & Onsite Financial Protection	FP-2	\$ (4,000)	\$ (4,000)	\$ (4,000)
Environmental Considerations	ENV-2	\$ (11,000)	\$ (11,000)	\$ (11,000)
Spent Fuel Management Planning	SFM-2	\$ (3,000)	\$ (3,000)	\$ (3,000)
Backfit Rule	B-2	\$ (3,000)	\$ (3,000)	\$ (3,000)

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars

---

## 6.7 General Public

Some areas of decommissioning considered in this analysis will result in additional burden to the general public because they would commit additional time to participate in public meetings and provide comments during the commenting periods for the proposed rulemaking stage.

Table 13 Costs to the General Public

Areas of Decommissioning	Alternatives	Total Costs (General Public)		
		Undiscounted	7% NPV	3% NPV
Emergency Preparedness	EP-2	\$ (2,000)	\$ (2,000)	\$ (2,000)
Decommissioning Funding Assurance	DTF-2	\$ (3,000)	\$ (3,000)	\$ (3,000)
Environmental Considerations	ENV-2	\$ (3,000)	\$ (3,000)	\$ (3,000)
Spent Fuel Management Planning	SFM-2	\$ (1,000)	\$ (1,000)	\$ (1,000)

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars

## 6.8 Environmental Considerations

Under Alternative ENV-2, guidance related to PSDARs would be revised to recommend that licensees provide information on how they would comply with all Federal, State, and local regulations in effect during decommissioning, such as those on nonradiological effluent releases, waste management, and environmental monitoring, in support of the PSDAR's discussion of environmental impacts. The environmental analyses that would bound the environmental impacts associated with site specific decommissioning activities generally assumed compliance with State and Federal regulations. Therefore, in determining if a decommissioning activity is bounded by previous analyses that relied on compliance with State and Federal regulations, the licensee should state whether it will continue to comply with applicable State and Federal regulations, which would strengthen the basis for determining whether environmental impacts are bounded. These updates to guidance documents under Alternative ENV-2 will result in additional time spent by the NRC, Industry, Other Government and the General Public to contribute to the updates.

Additionally Alternative ENV-2 proposes to modify the rule language in 10 CFR 50.82(a)(4) to clarify that licensees no longer must conclude in the PSDAR that the environmental impacts of all planned decommissioning activities are bounded by appropriate previously issued environmental impact statements, but rather must evaluate whether the planned decommissioning activities will or will not be bounded by appropriate federally issued environmental review documents. If unbounded impacts are identified, then, consistent with 10 CFR 50.82(a)(6)(ii) and 10 CFR 52.110(f)(2), the licensee can address those impacts before the associated activity occurs instead of being required to address those impacts at the PSDAR stage.

## 6.9 Disaggregation

The NRC completed a screening review in accordance with the guidance in Section 4.3.2, "Criteria for the Treatment of Individual Requirements," of NUREG/BR-0058, for the areas of decommissioning containing an alternative that includes rulemaking:

- Emergency Preparedness

- 
- Physical Security
  - Cyber Security
  - FFD – Drug & Alcohol
  - Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor
  - Decommissioning Funding Assurance
  - Offsite and Onsite Financial Protection Requirements and Indemnity Agreements
  - Environmental Considerations
  - Record Retention Requirements
  - Low-Level Waste Transportation Time
  - Spent Fuel Management Requirements
  - Backfit Rule
  - Foreign Ownership, Control, or Domination (FOCD)
  - Clarification of Scope of License Termination Plan Requirement

In the screening review, the analysis evaluated each requirement of each area of decommissioning and found that the requirements considered separately would not mask the inclusion of other unnecessary requirements.

### **6.10 Uncertainty Analysis**

To determine the robustness of the costs and net benefits contained within this document, the NRC examined how the values estimated for benefits and costs change due to uncertainties associated with the staff's analytical assumptions and input data. The NRC used Monte Carlo simulations to examine the impact of uncertainty on the estimated costs and benefits of each area of decommissioning and performed the simulations using the @Risk software package by Palisade Corporation.<sup>13</sup>

Monte Carlo simulations involve introducing uncertainty into the analysis by replacing the point estimates of the variables used to estimate costs and benefits with probability distributions. By defining input variables as probability distributions as opposed to point estimates, the effect of uncertainty on the results of the analysis (i.e., the benefits and costs) can be modeled. The probability distributions were chosen to represent the different variables in the analysis and are defined by a bounded range of estimates. These bounded ranges of estimates were determined from data collected via the Agencywide Documents Access and Management System (ADAMS) and the NRC staff's professional judgment.

---

<sup>13</sup> Information about this software is available online at [www.palisade.com](http://www.palisade.com).

The probability distributions are also defined by summary statistics. These summary statistics include the minimum and maximum of program evaluation and review technique (PERT)<sup>14</sup> and uniform distributions. For these distributions, the NRC used collected input to set the minimum and maximum values of the PERT and uniform distributions. Lastly, the NRC selected the output variables for the Monte Carlo simulations, which are the estimated monetary costs and benefits. The Monte Carlo simulations included 10,000 iterations and resulted in a monetary range of costs and benefits for each alternative of each area of decommissioning under consideration in proposed rulemaking. Additionally, @Risk was used to generate a tornado chart via the Monte Carlo simulations. The tornado chart identifies the input factors (cost drivers) that are ranked by effect on total cost. The results of the uncertainty analysis for the costing of each area of decommissioning are presented.

### 6.10.1 Emergency Preparedness

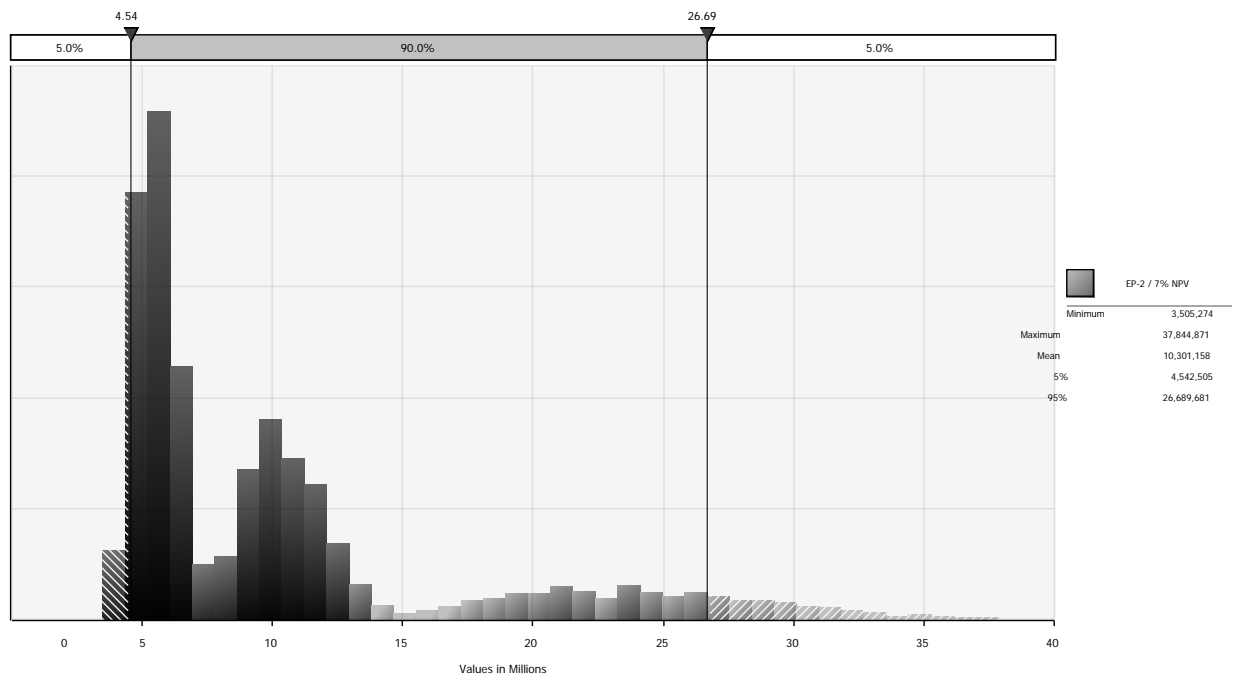


Figure 1 Variation of industry cost due to the uncertainty in the Emergency Preparedness cost drivers (Alternative EP-2)

<sup>14</sup> A PERT distribution is a special form of the beta distribution with a minimum and maximum value specified. The shape parameter is calculated from the defined most likely value. The PERT distribution is similar to a triangular distribution, in that it has the same set of three parameters. Technically, it is a special case of a scaled beta (or beta general) distribution. It can generally be considered as superior to the triangular distribution when the parameters result in a skewed distribution, as the smooth shape of the curve places less emphasis in the direction of skew. Similar to the triangular distribution, the PERT distribution is bounded on both sides, and therefore may not be adequate for some modelling purposes where it is desired to capture tail or extreme events.

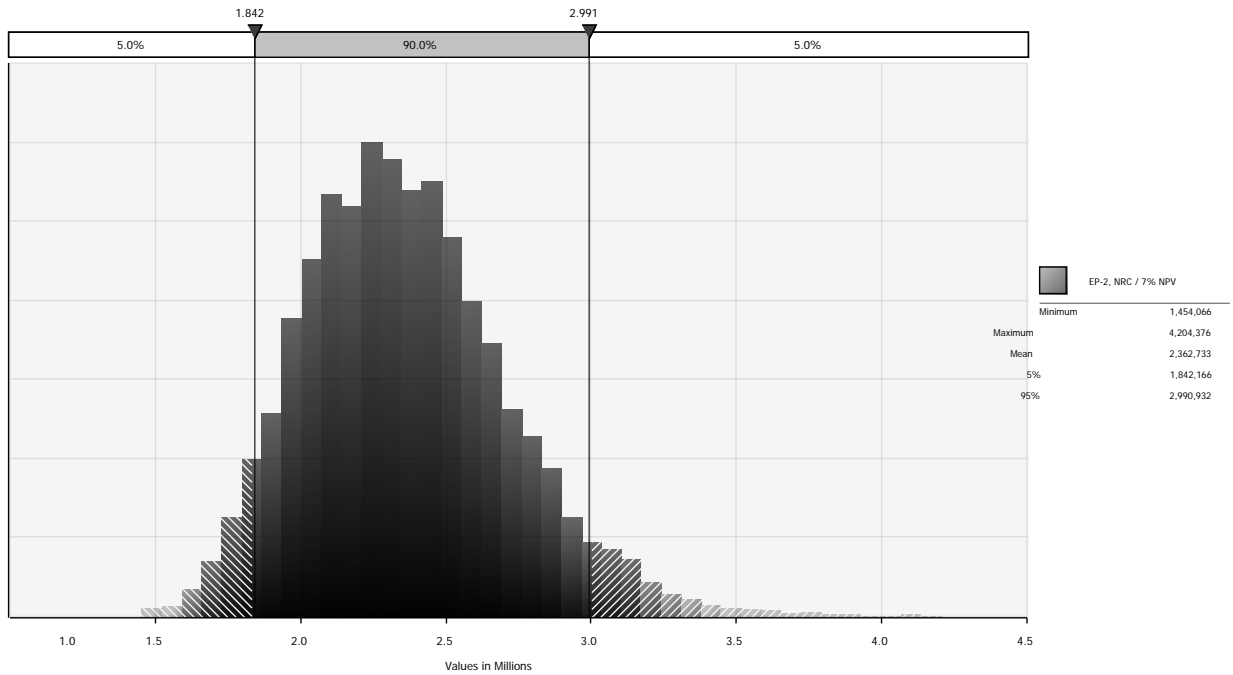


Figure 2 Variation of NRC cost due to the uncertainty in the Emergency Preparedness cost drivers (Alternative EP-2)

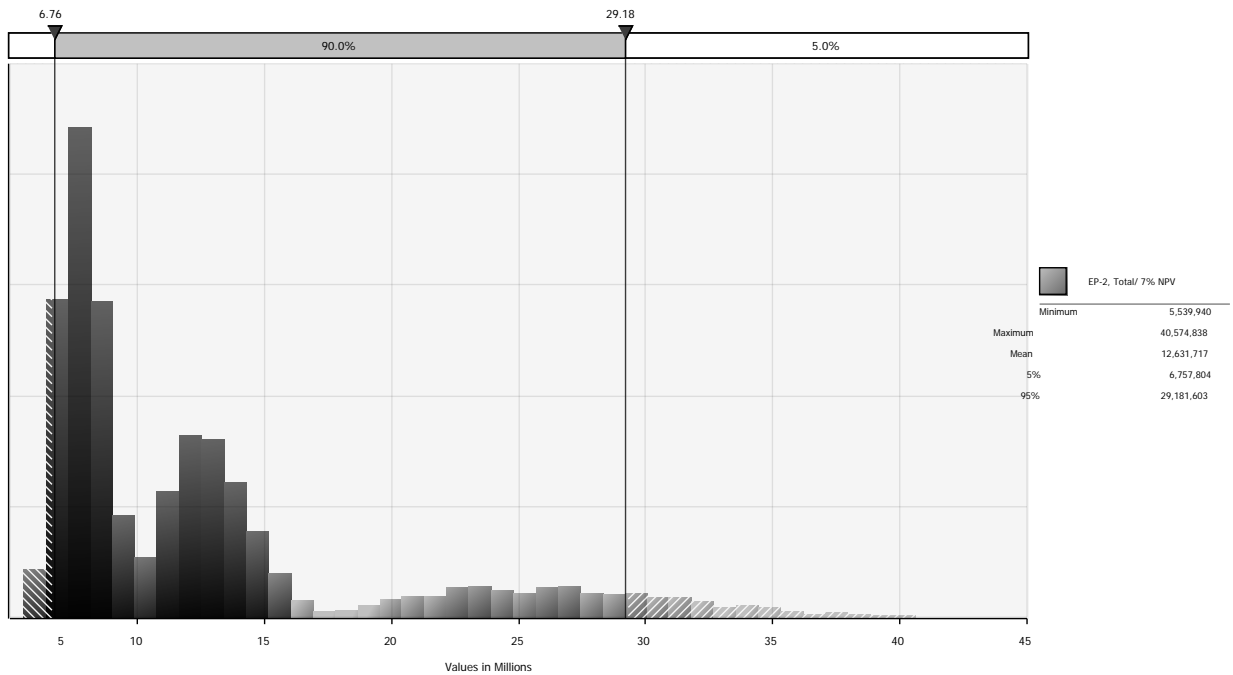


Figure 3 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Emergency Preparedness cost drivers (Alternative EP-2)

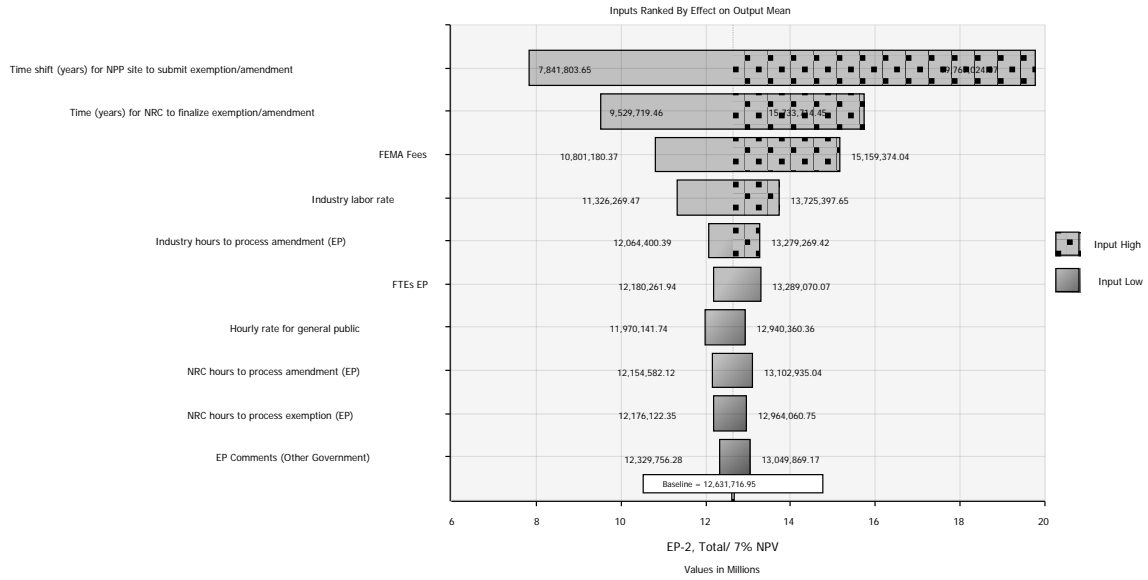


Figure 4 Tornado chart showing the variation of total cost due to each Emergency Preparedness cost driver (Alternative EP-2)

The regulatory changes to the Emergency Preparedness area of decommissioning for EP-2 would result in averted costs to the industry, NRC, State and local governments and general public over the decommissioning period in the range of \$5.5 million to \$40.6 million (7 percent NPV). The cost drivers that have the greatest influence are the time at which the licensee submits an exemption or amendment to the NRC for processing (i.e., 1 year before, during, or 1 year after decommissioning) and the time it takes the NRC to finalize the exemption or amendment. Note that the time at which an exemption from offsite emergency preparedness is submitted to the NRC may or may not lead to averted FEMA fees after Level 2. This depends on whether or not the exemption is submitted at or before the starting time of decommissioning. Nevertheless, this possible averted cost is represented by the uncertainty analysis.



## 6.10.2 Physical Security

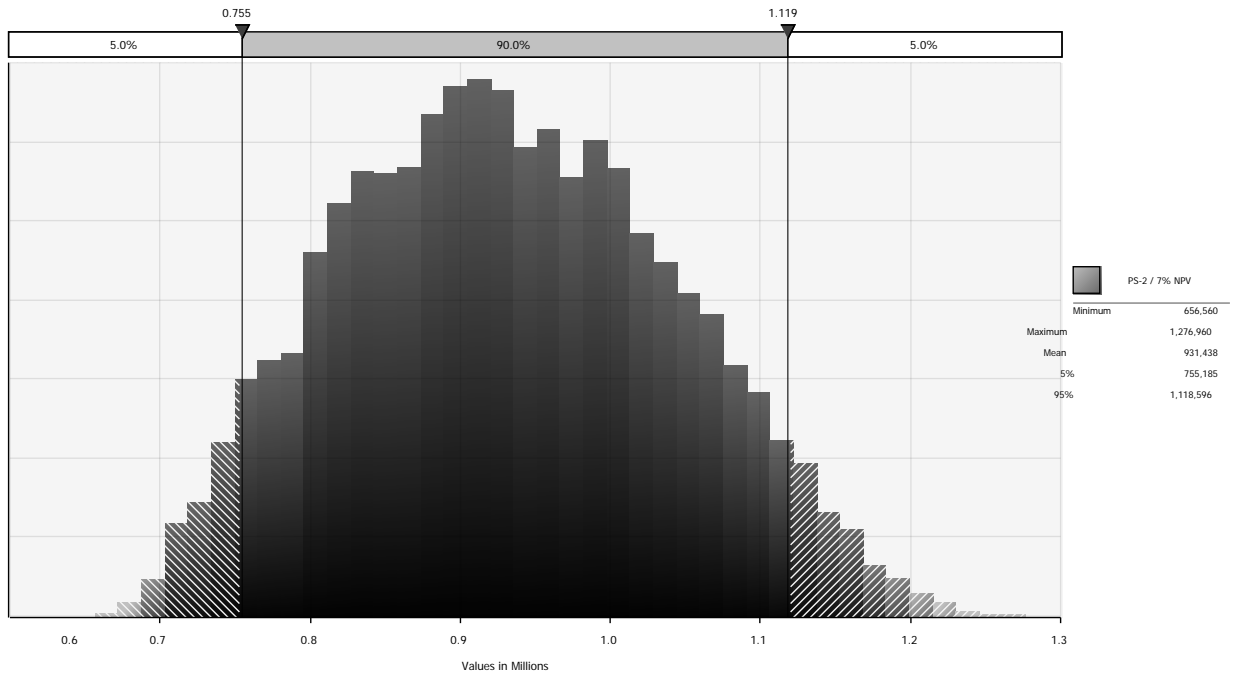


Figure 5 Variation of industry cost due to the uncertainty in the Physical Security cost drivers (Alternative PS-2)

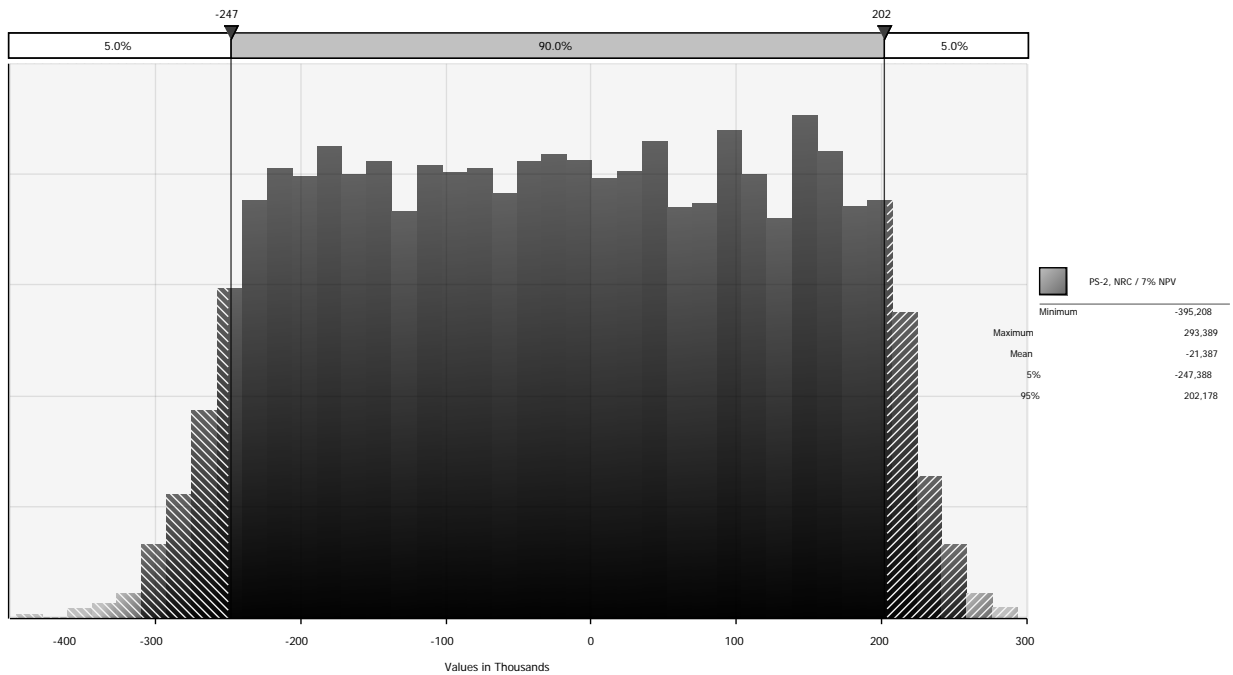


Figure 6 Variation of NRC cost due to the uncertainty in the Physical Security cost drivers (Alternative PS-2)

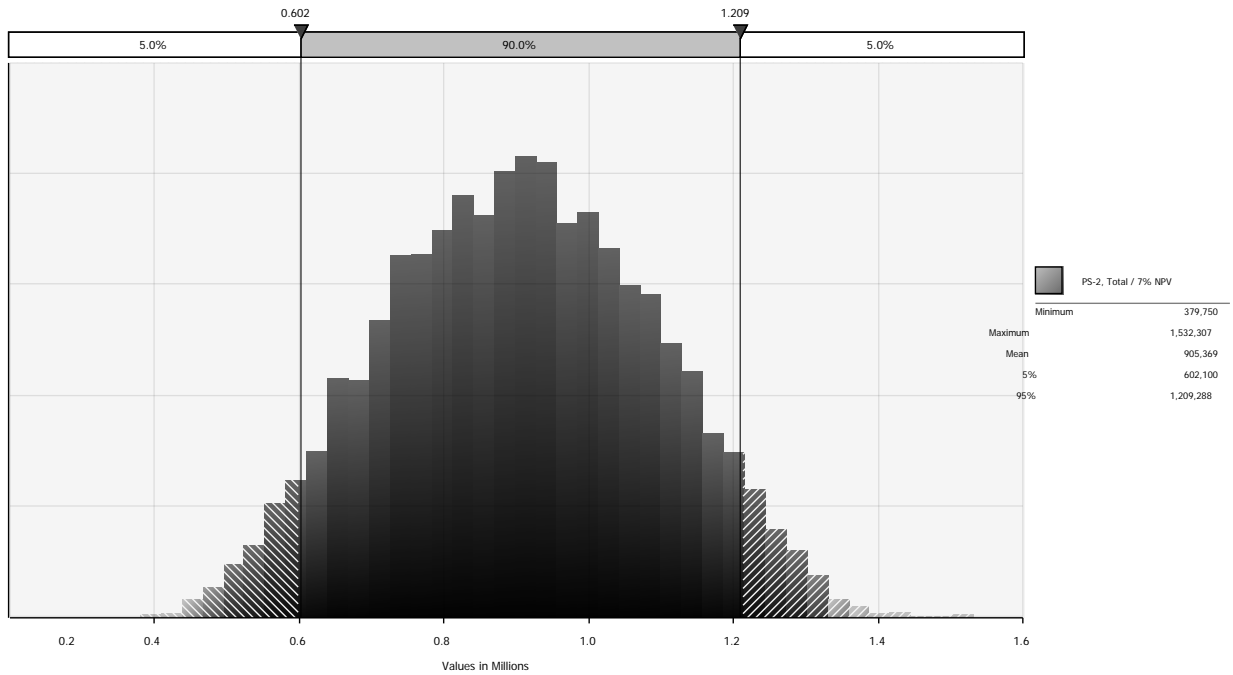


Figure 7 Variation of total cost industry, NRC, State and local governments and general public) due to the uncertainty in the Physical Security cost drivers (Alternative PS-2)

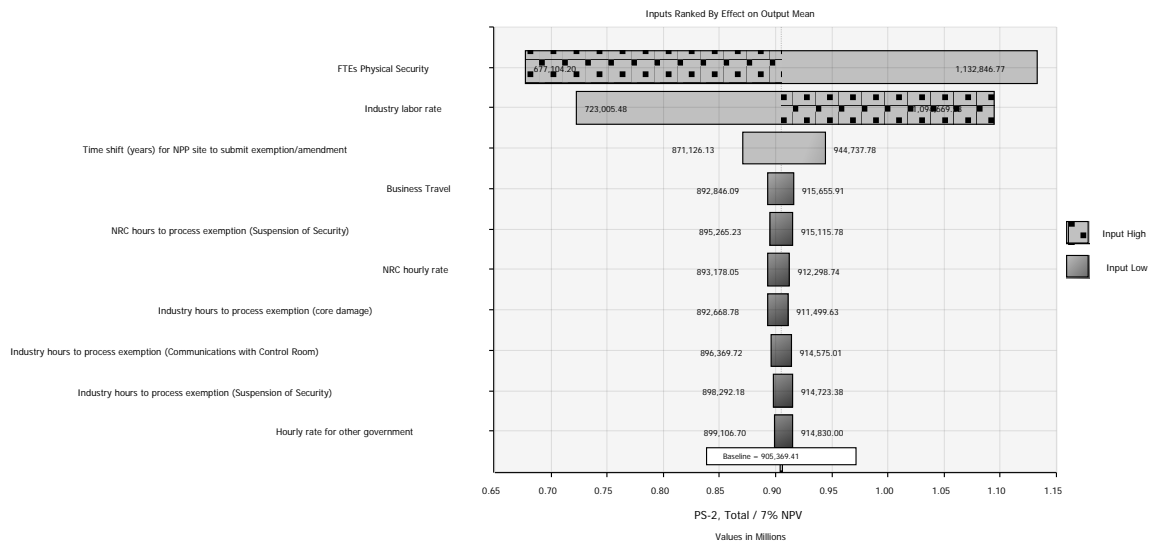


Figure 8 Tornado chart showing the variation of total cost due to each Physical Security cost driver (Alternative PS-2)

The regulatory changes to the Physical Security area of decommissioning will result in averted costs to the industry, NRC, State and local governments and general public over the decommissioning period in the range of \$380,000 to \$1.5 million (7 percent NPV). The cost drivers that have the greatest influence are the number of NRC full-time equivalents (FTEs) to implement rulemaking for this area of decommissioning and the nuclear power industry labor rate for hours averted to process exemptions and amendments.

### 6.10.3 Cyber Security

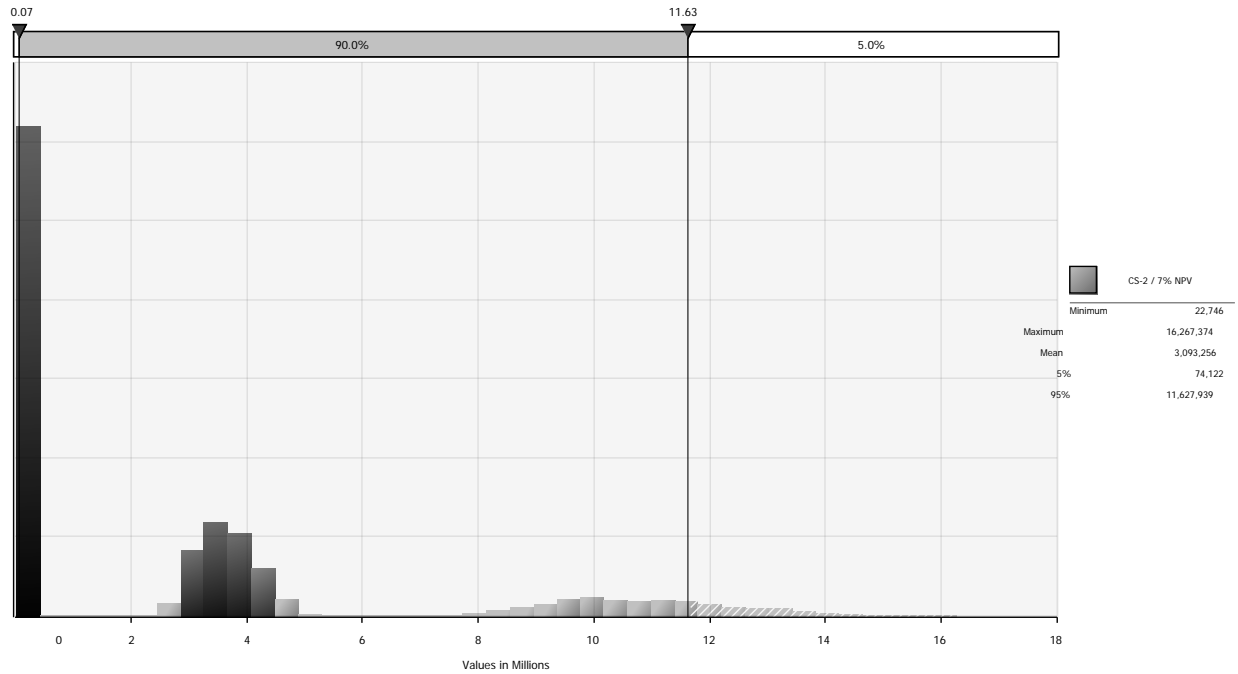


Figure 9 Variation of industry cost due to the uncertainty in the cyber security cost drivers (Alternative CS-2)

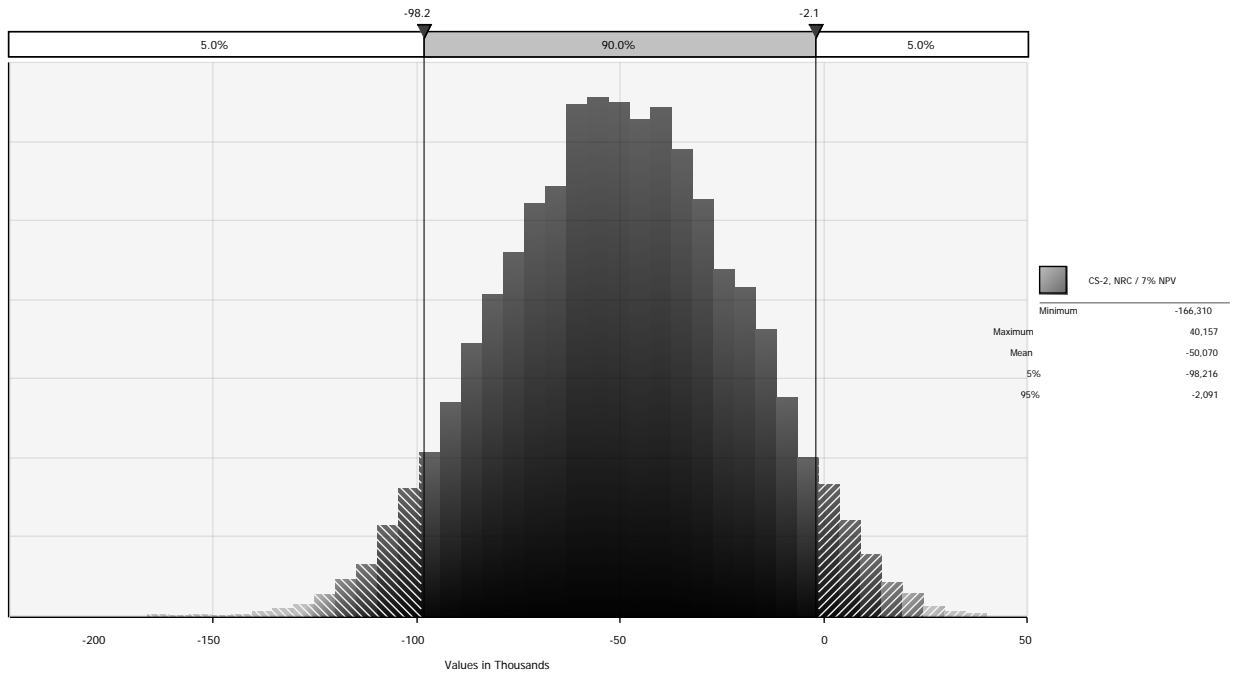


Figure 10 Variation of NRC cost due to the uncertainty in the cyber security cost drivers (Alternative CS-2)

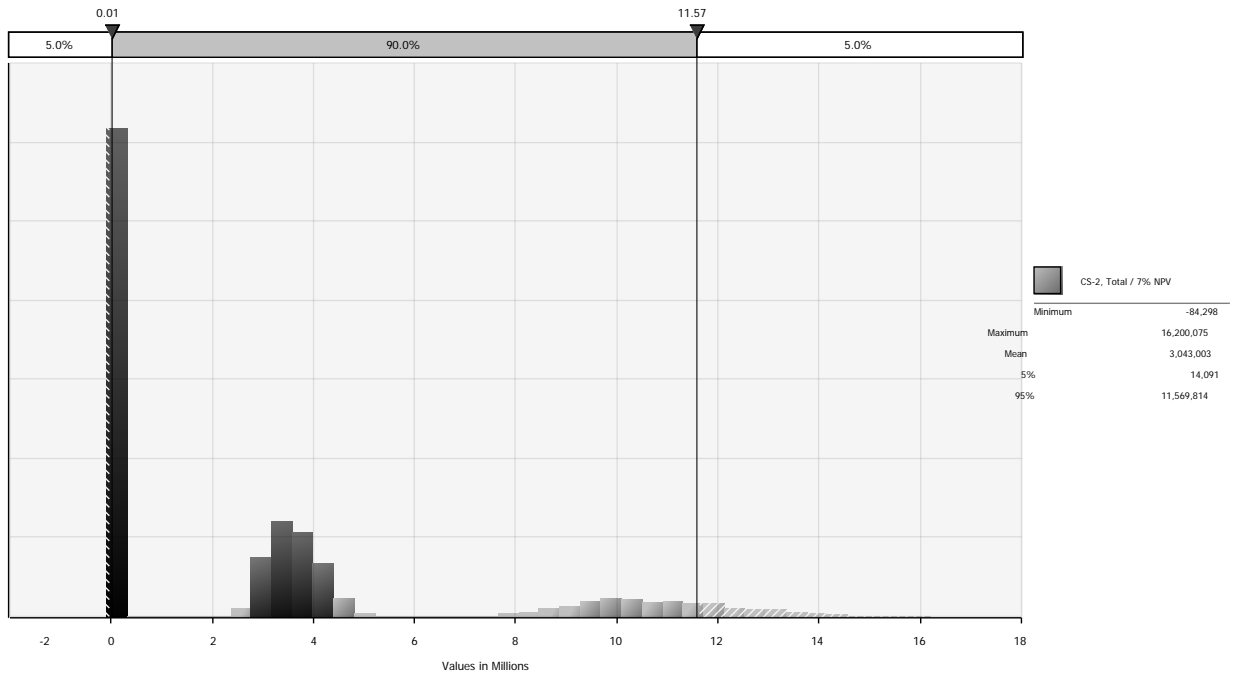


Figure 11 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cyber security cost drivers (Alternative CS-2)

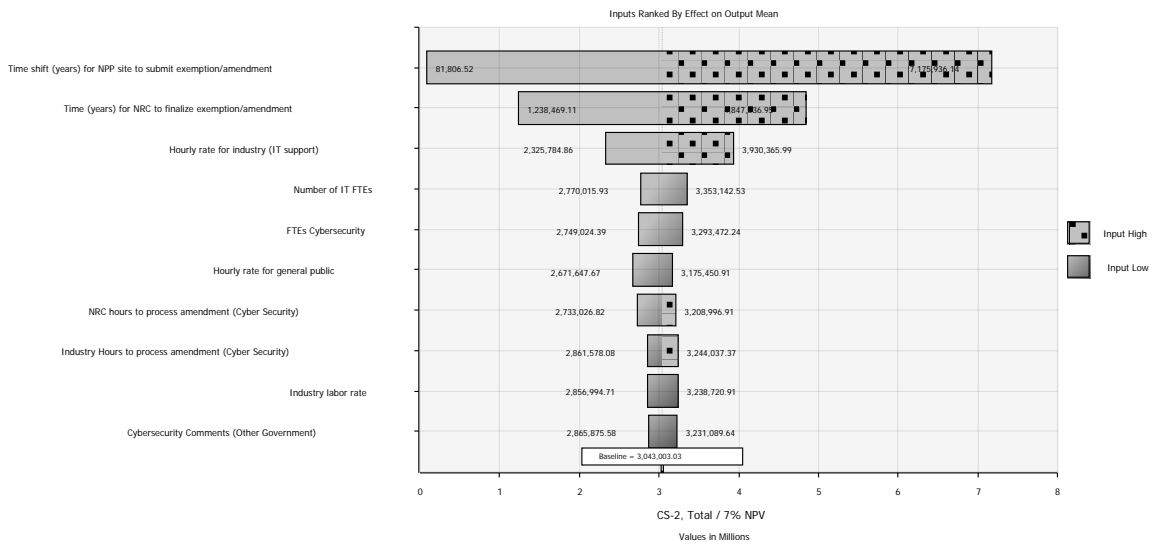


Figure 12 Tornado chart showing the variation of total cost due to each cyber security cost driver (Alternative CS-2)

The recommended regulatory changes to the cyber security area of decommissioning (Alternative CS-2) will result in additional or averted costs to industry, NRC, State and local governments and general public over the decommissioning period in the range of (\$84,000) to 16.2 million at 7 percent NPV. The cost drivers that have the greatest influence are the time at which the licensee submits an exemption or amendment to the NRC for processing (i.e., 1 year before, during, or 1 year after decommissioning) and the time it takes the NRC to finalize the exemption or amendment.

### 6.10.4 Drug and Alcohol Testing

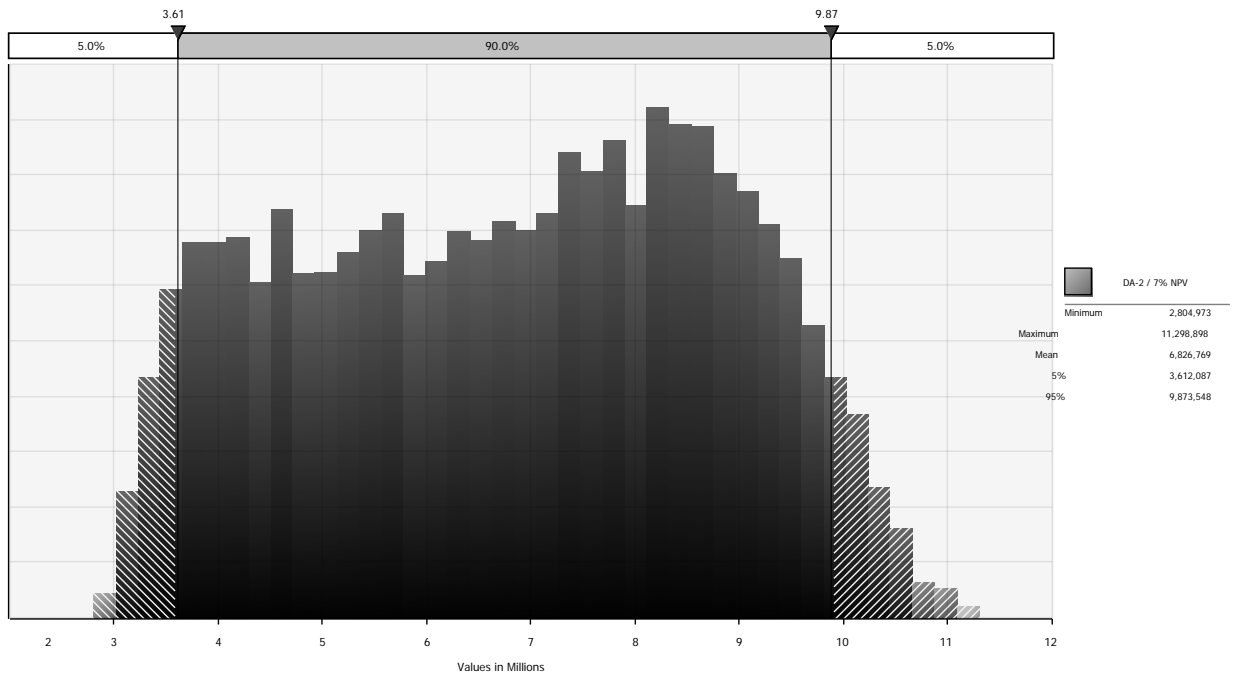


Figure 13 Variation of industry cost due to the uncertainty in the Drug and Alcohol Testing cost drivers (Alternative DA-2)

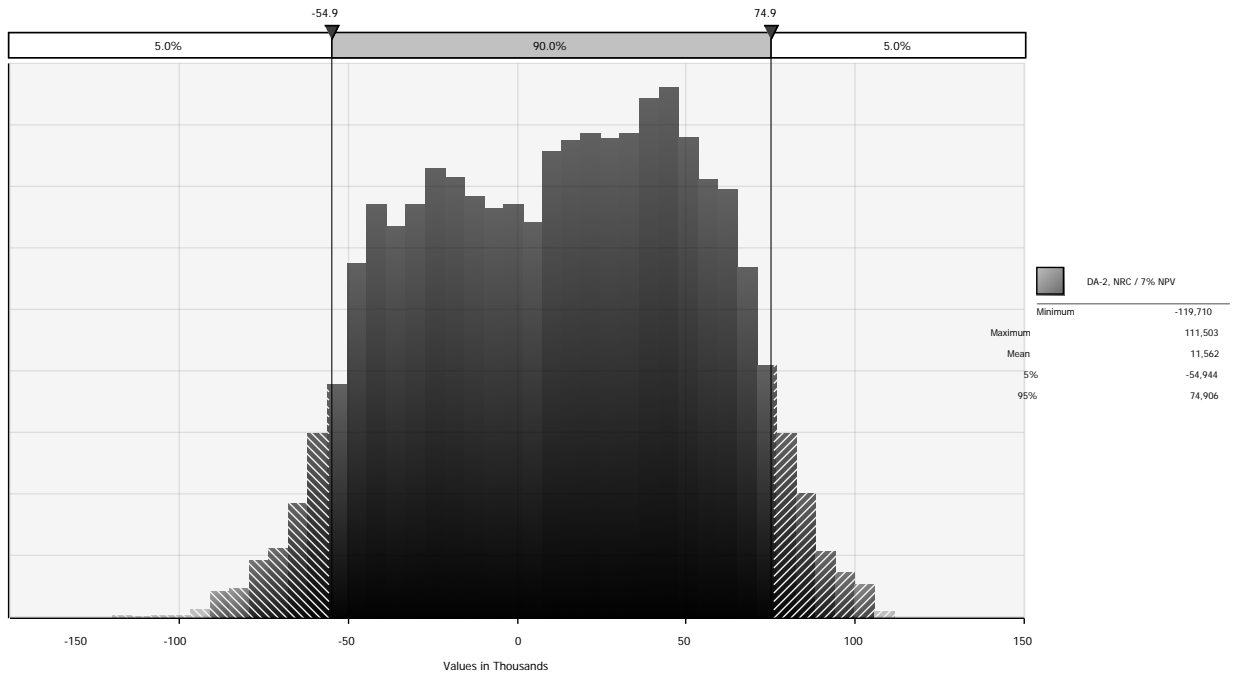


Figure 14 Variation of NRC cost due to the uncertainty in the Drug and Alcohol Testing cost drivers (Alternative DA-2)

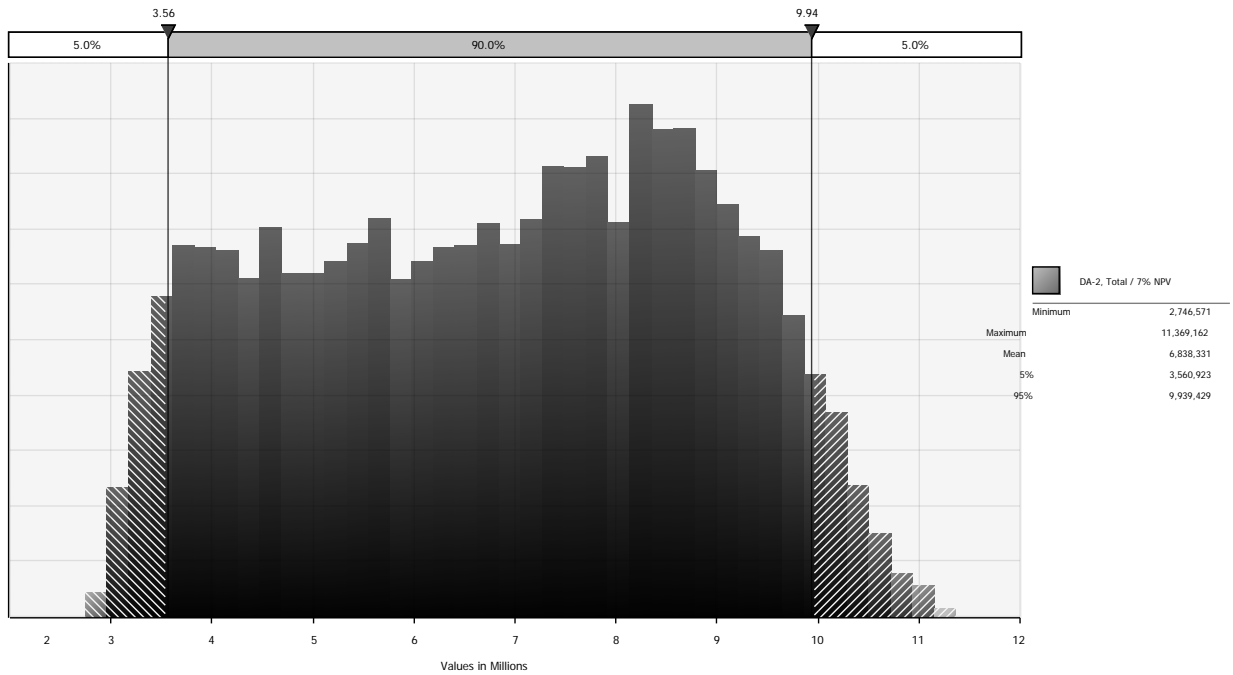


Figure 15 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Drug and Alcohol Testing cost drivers (Alternative DA-2)

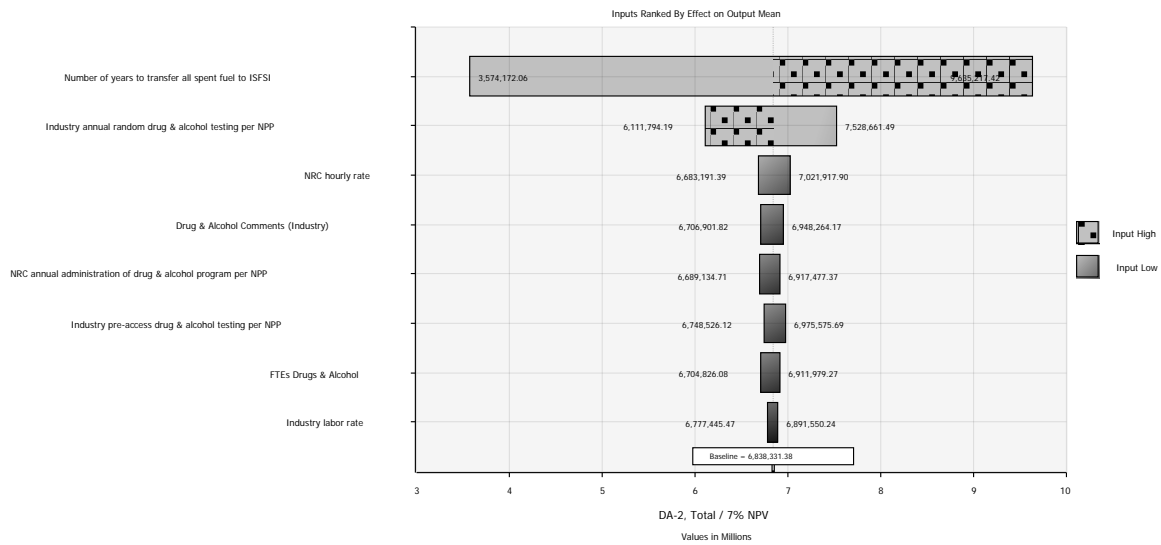


Figure 16 Tornado chart showing the variation of total cost due to each Drug and Alcohol Testing cost driver (Alternative DA-2)

The regulatory changes to the FFD-Drug and Alcohol Testing area of decommissioning (Alternative DA-2) will result in averted costs to the industry, NRC, State and local governments and general public over the decommissioning period in the range of \$2.7 million to \$11.4 million using a 7 percent NPV. The cost drivers that have the greatest influence on total cost are the number of years to transfer all spent fuel to ISFSI and the random drug and alcohol testing.

### 6.10.5 Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor

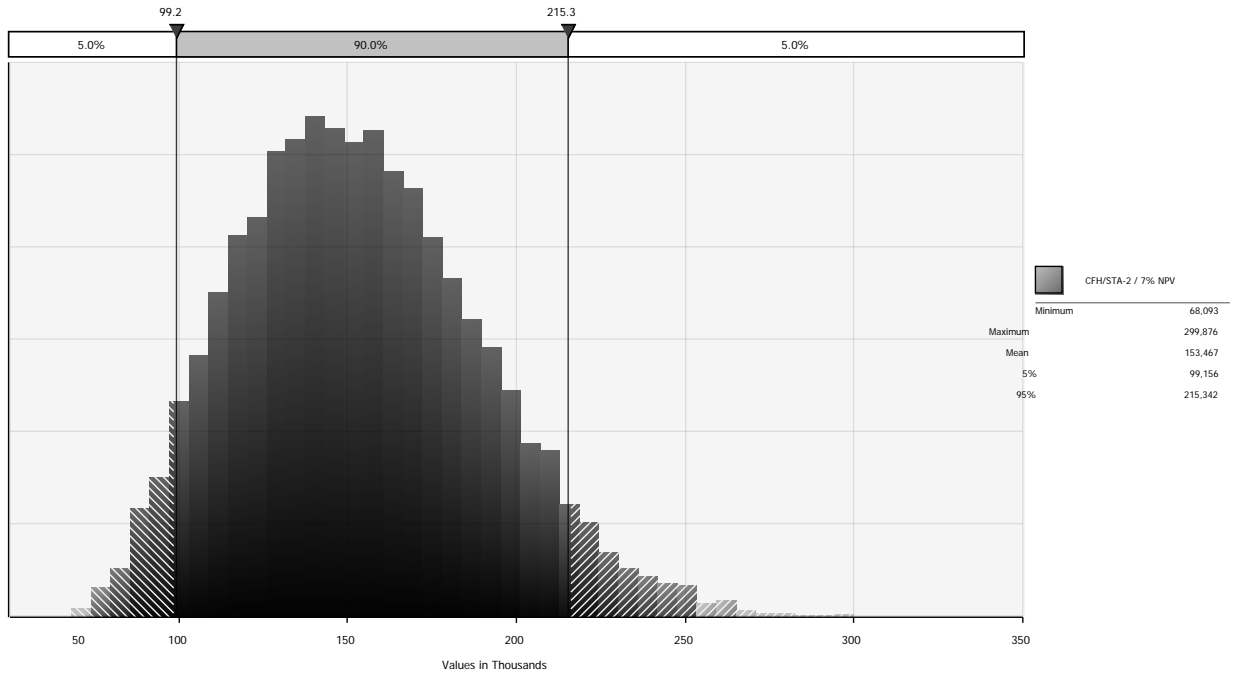


Figure 17 Variation of industry cost due to the uncertainty in the Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor cost drivers (Alternative CFH/STA-2)

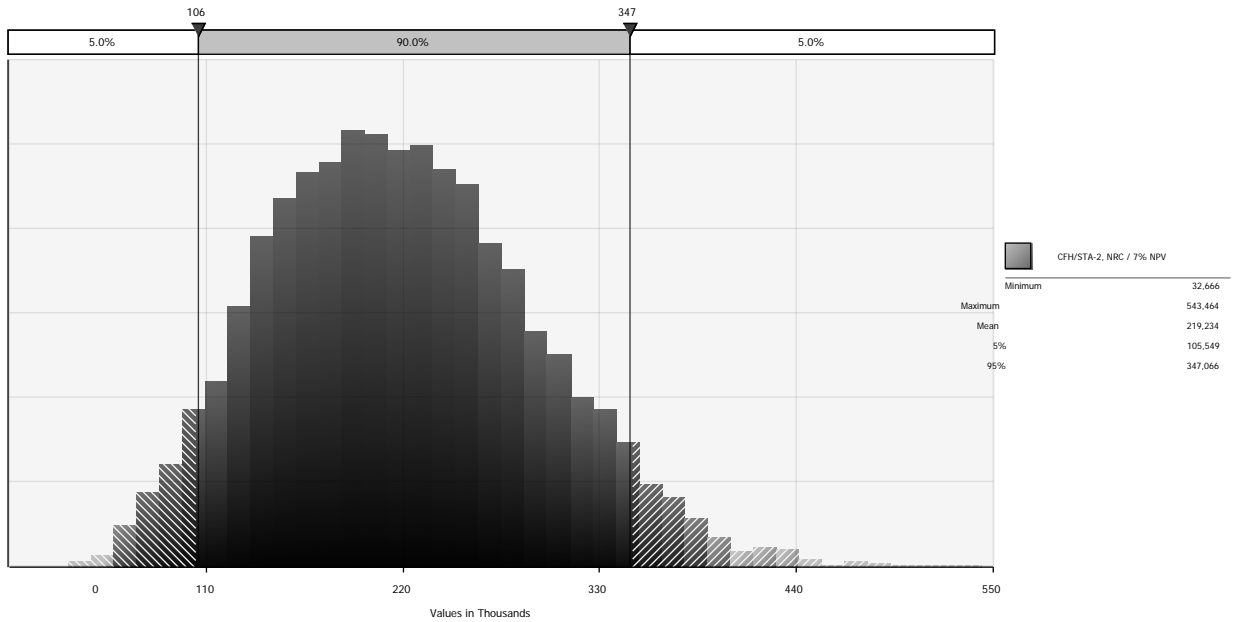


Figure 18 Variation of NRC cost due to the uncertainty in the Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor cost drivers (Alternative CFH/STA-2)

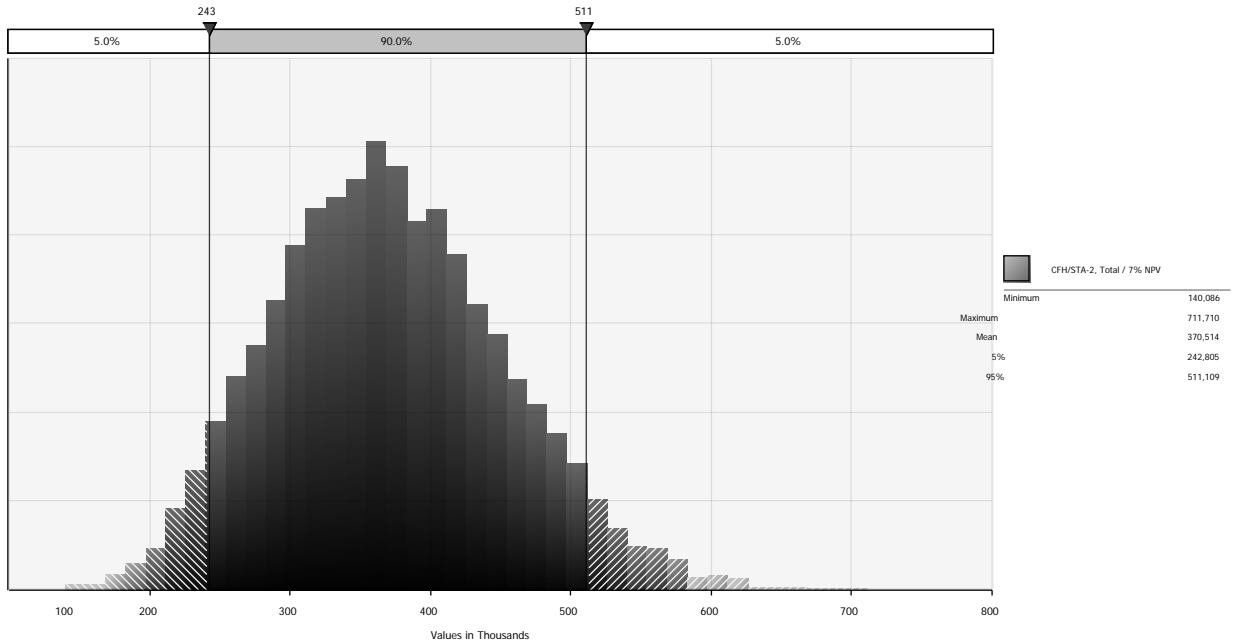


Figure 19 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor cost drivers (Alternative CFH/STA-2)

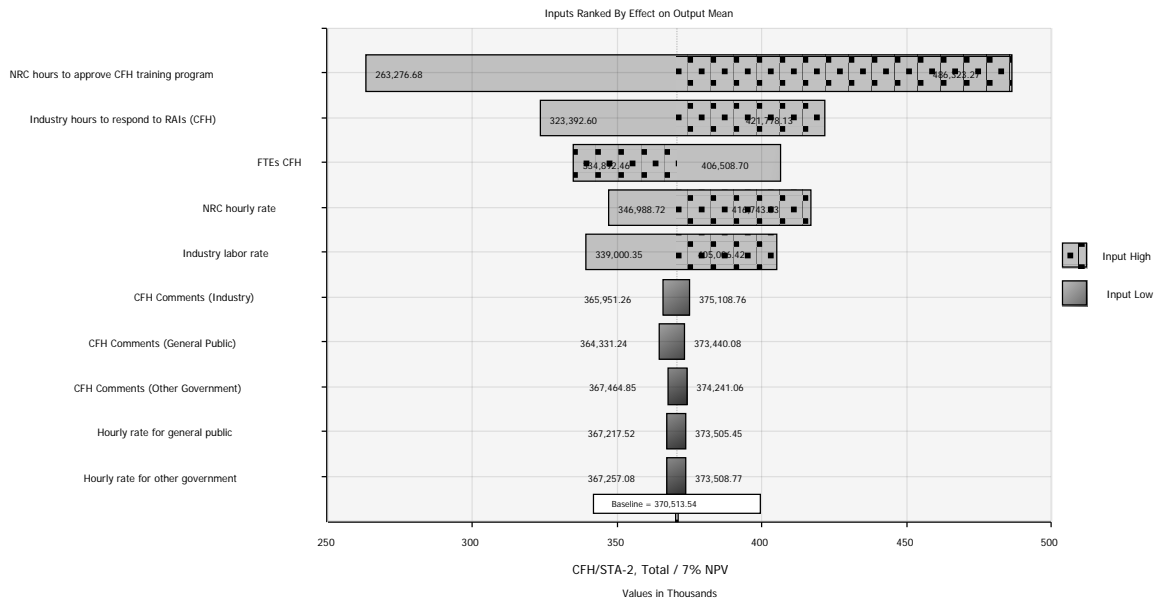


Figure 20 Tornado chart showing the variation of total cost due to each Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor cost driver (Alternative CFH/STA-2)

The regulatory changes to the training requirements for the Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor area of decommissioning (Alternative CFH/STA-2) will result in averted costs to the industry, NRC, State and local governments and general public over the decommissioning period in the range of \$140,000 to \$712,000 using a 7 percent NPV.



The cost driver that has the greatest influence on total cost for this area of decommissioning is the number of hours for NRC to approve a CFH training program.

### 6.10.6 Decommissioning Funding Assurance

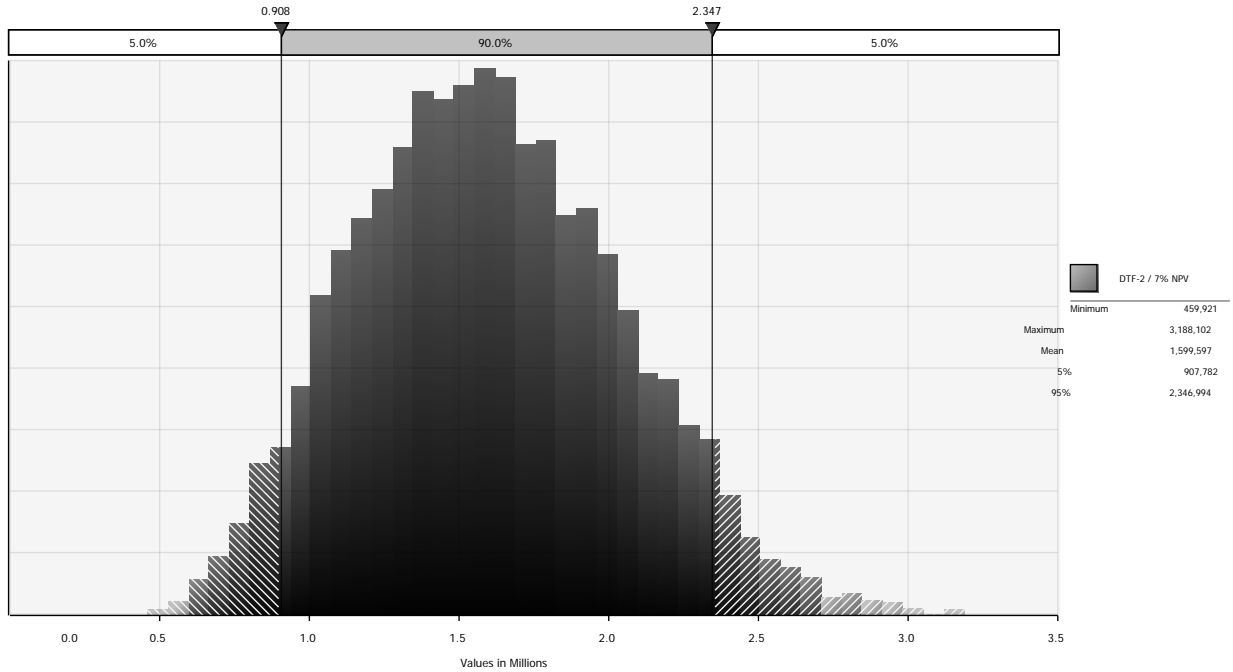


Figure 21 Variation of industry cost due to the uncertainty in the Decommissioning Funding Assurance cost drivers (Alternative DTF-2)

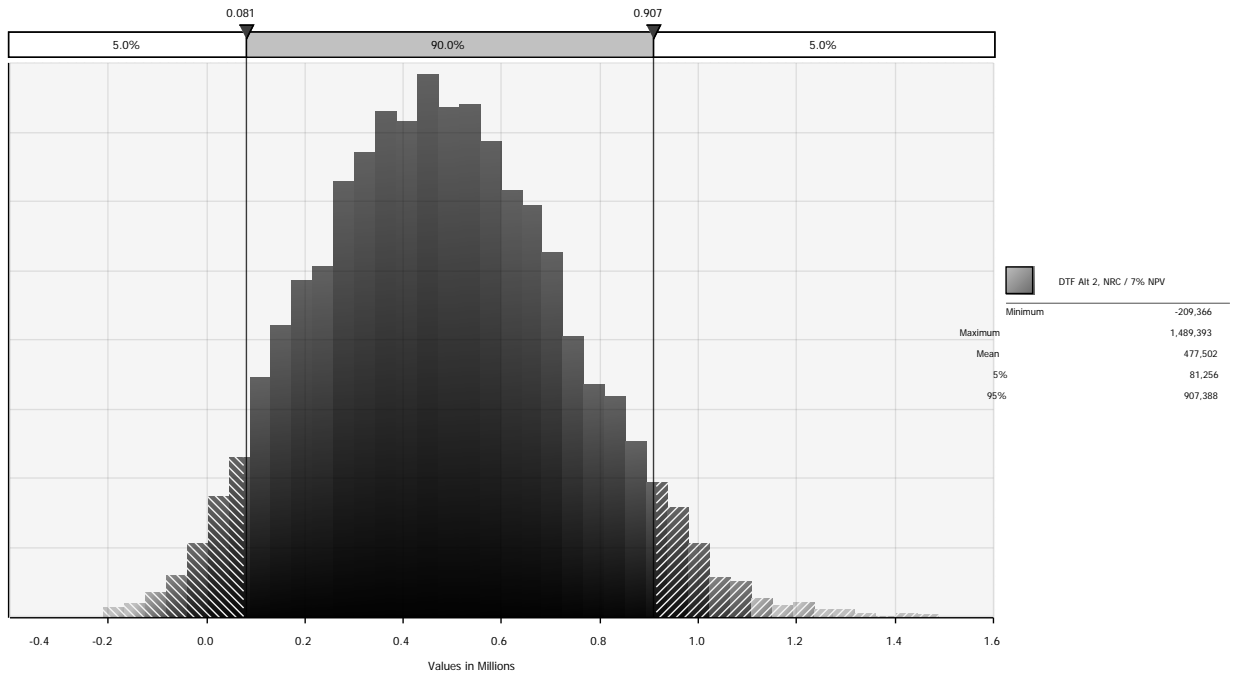


Figure 22 Variation of NRC cost due to the uncertainty in the Decommissioning Funding Assurance cost drivers (Alternative DTF-2)

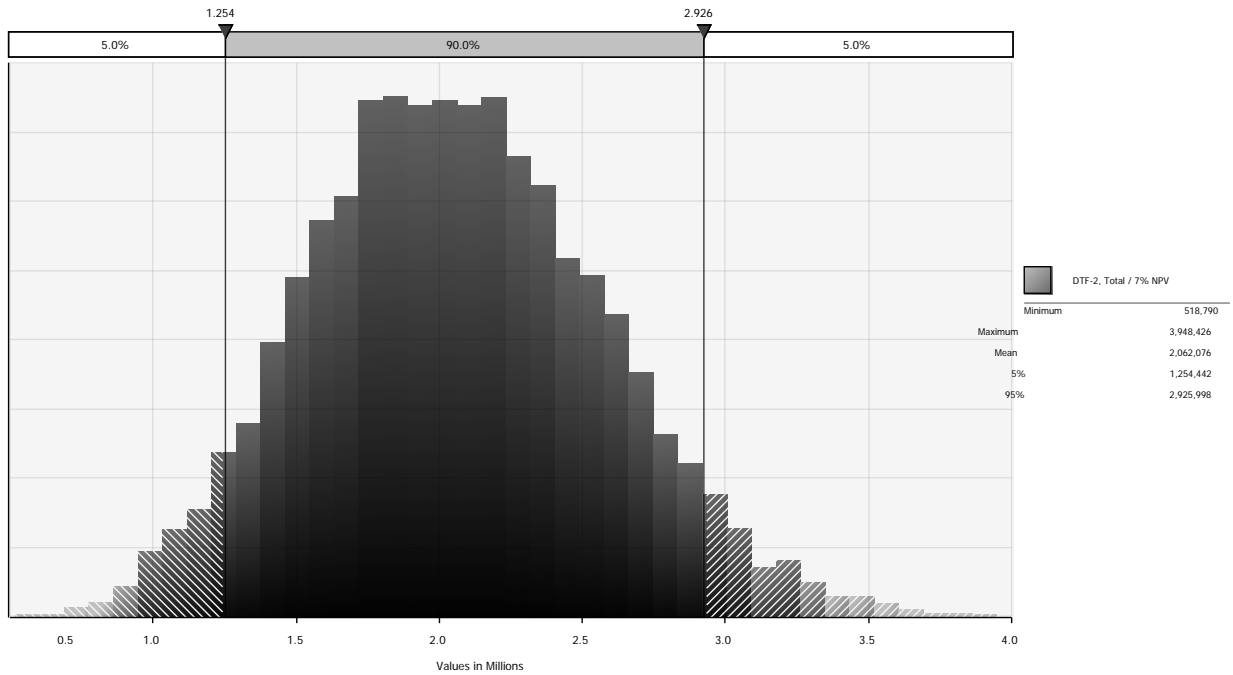


Figure 23 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Decommissioning Funding Assurance cost drivers (Alternative DTF-2)

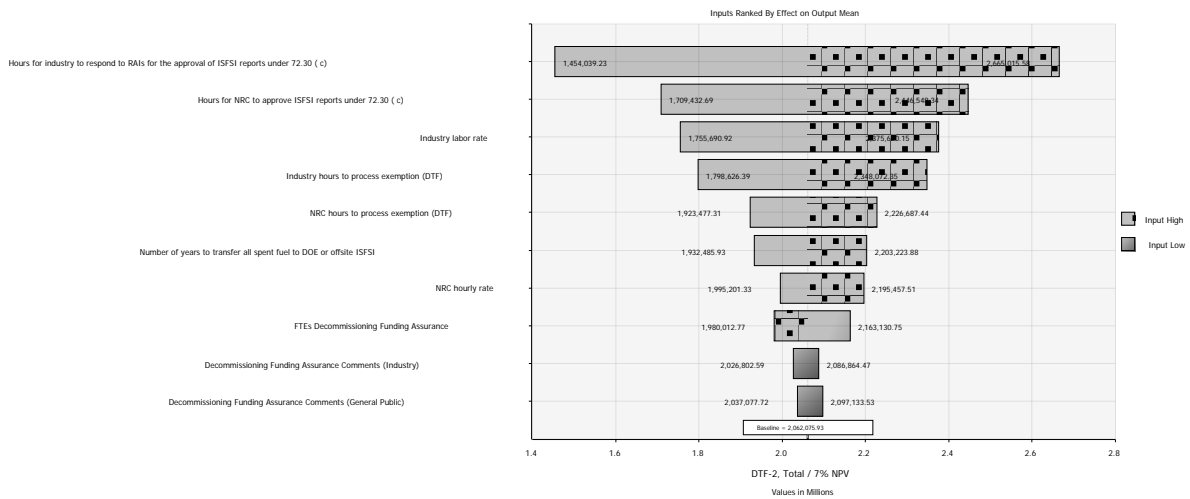


Figure 24 Tornado chart showing the variation of total cost due to each Decommissioning Funding Assurance cost driver (Alternative DTF-2)

The regulatory changes to this area of decommissioning (Alternative DTF-2) will result in averted costs to the industry, NRC, State and local governments and general public over the decommissioning period in the range of \$519,000 to \$3.9 million using a 7 percent NPV. The cost drivers that have the greatest influence on total cost are the number of hours the industry and the NRC would take to go through the approval process for ISFSI reports under 72.30 (c).

## 6.10.7 Offsite and Onsite Financial Protection Requirements and Indemnity Agreements

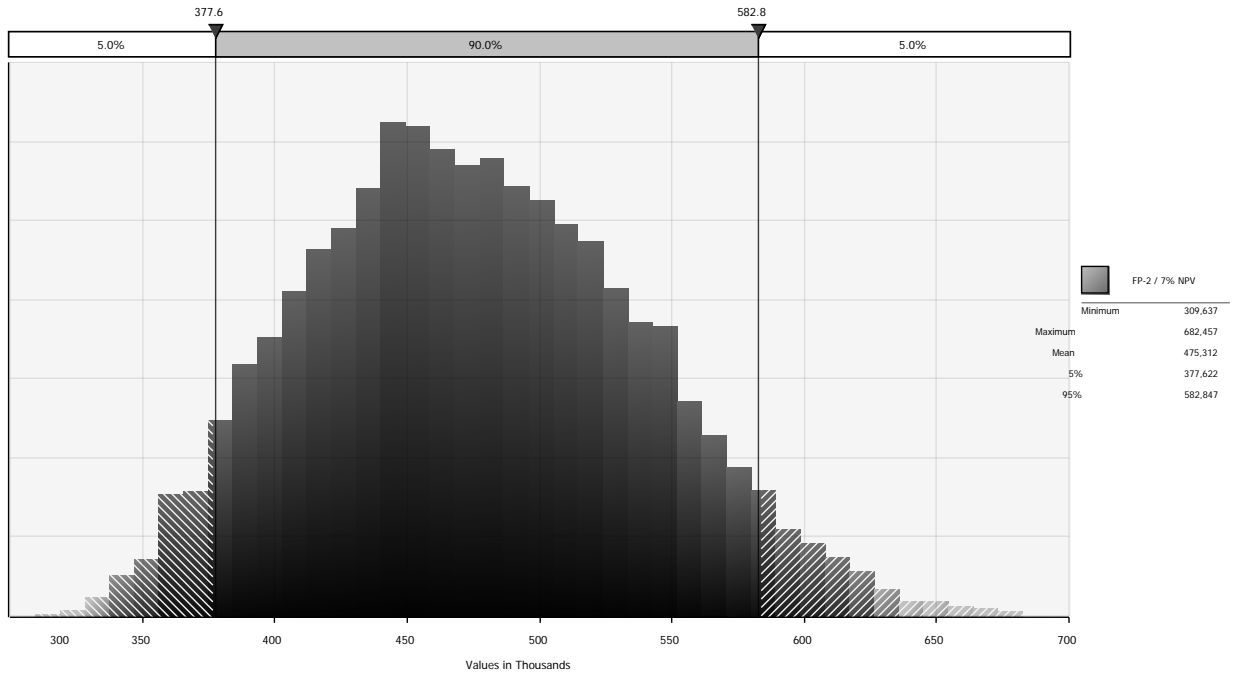


Figure 25 Variation of industry cost due to the uncertainty in the Financial Protection cost drivers (Alternative FP-2)

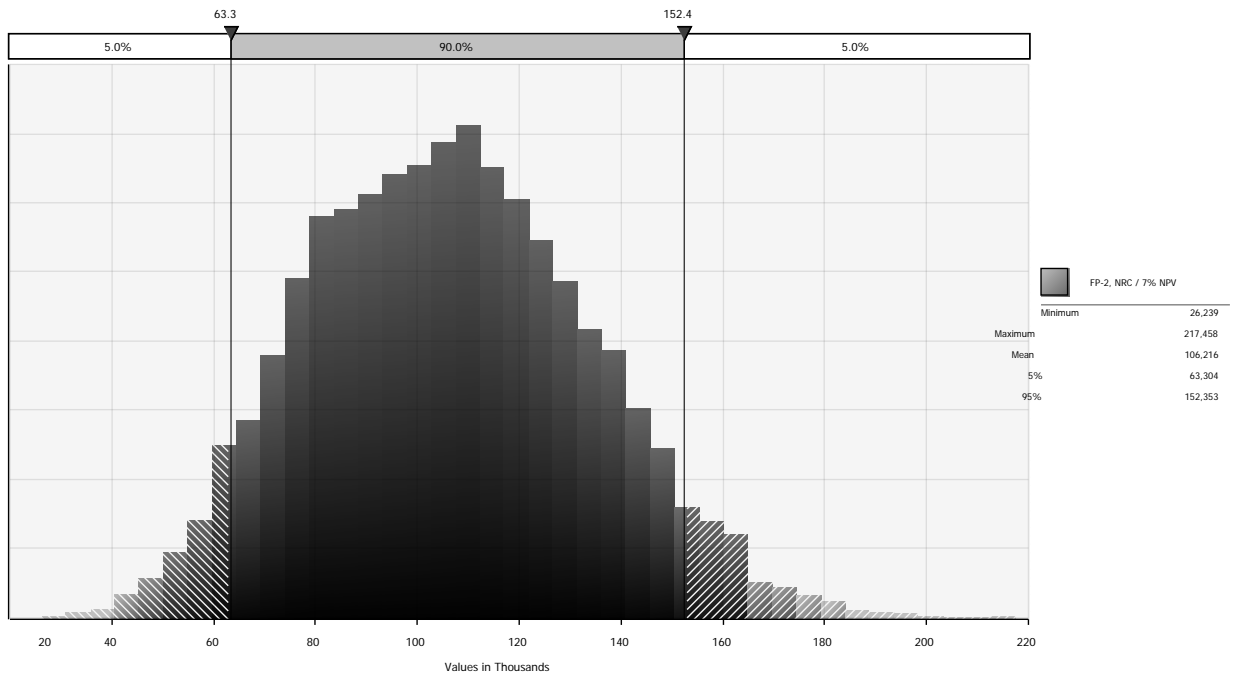


Figure 26 Variation of NRC cost due to the uncertainty in the Financial Protection cost drivers (Alternative FP-2)

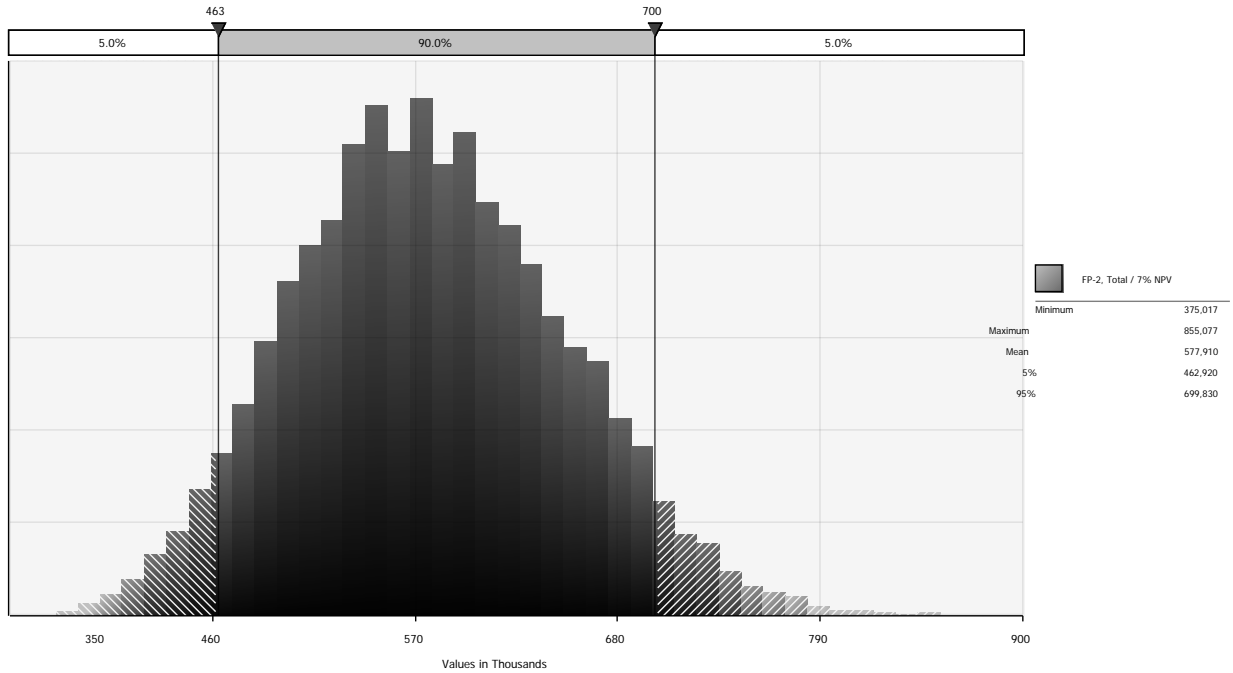


Figure 27 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the Financial Protection cost drivers (Alternative FP-2)

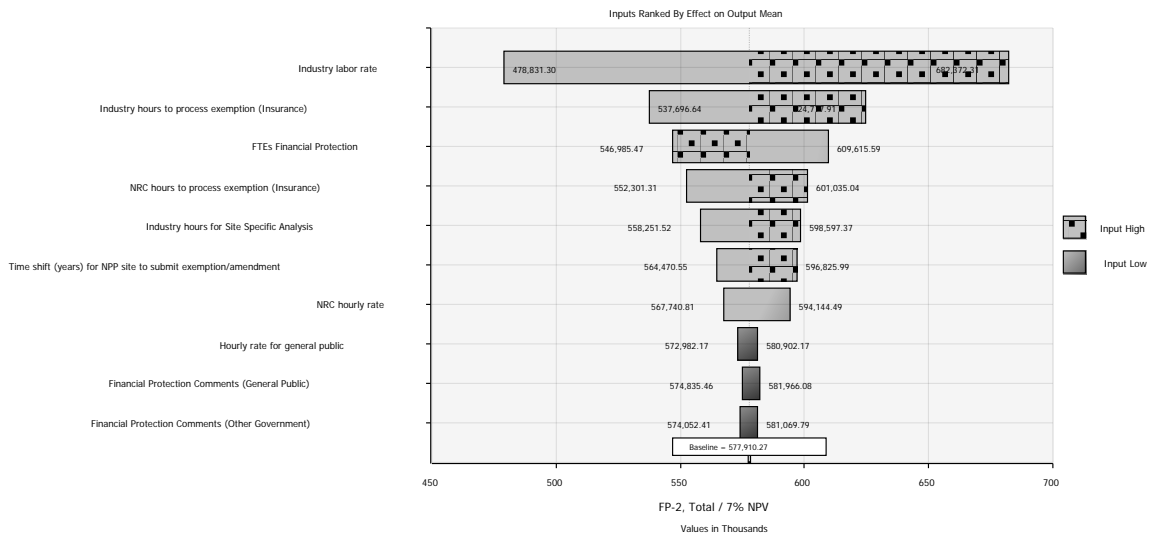


Figure 28 Tornado Chart showing the variation of total cost due to each Financial Protection cost driver (Alternative FP-2)

The regulatory changes to the Offsite and Onsite Financial Protection area of decommissioning (Alternative FP-2) will result in averted costs to the industry, NRC, State and local governments and general public over the decommissioning period in the range of \$375,000 to \$855,000 using a 7 percent NPV. The cost drivers that have the greatest influence on total cost are the nuclear power industry labor rate and the hours for a licensee to process an exemption for insurance.

## 6.10.8 Environmental Considerations

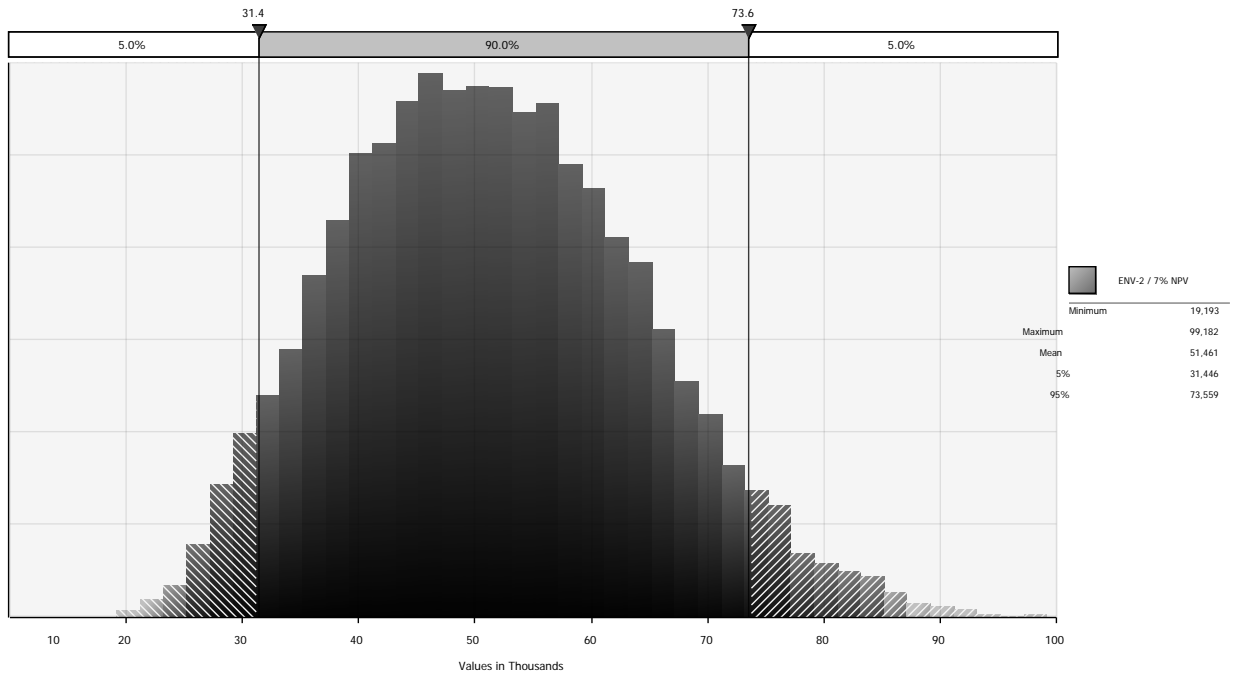


Figure 29 Variation of industry cost due to the uncertainty in the cost input variables (Alternative ENV-2)

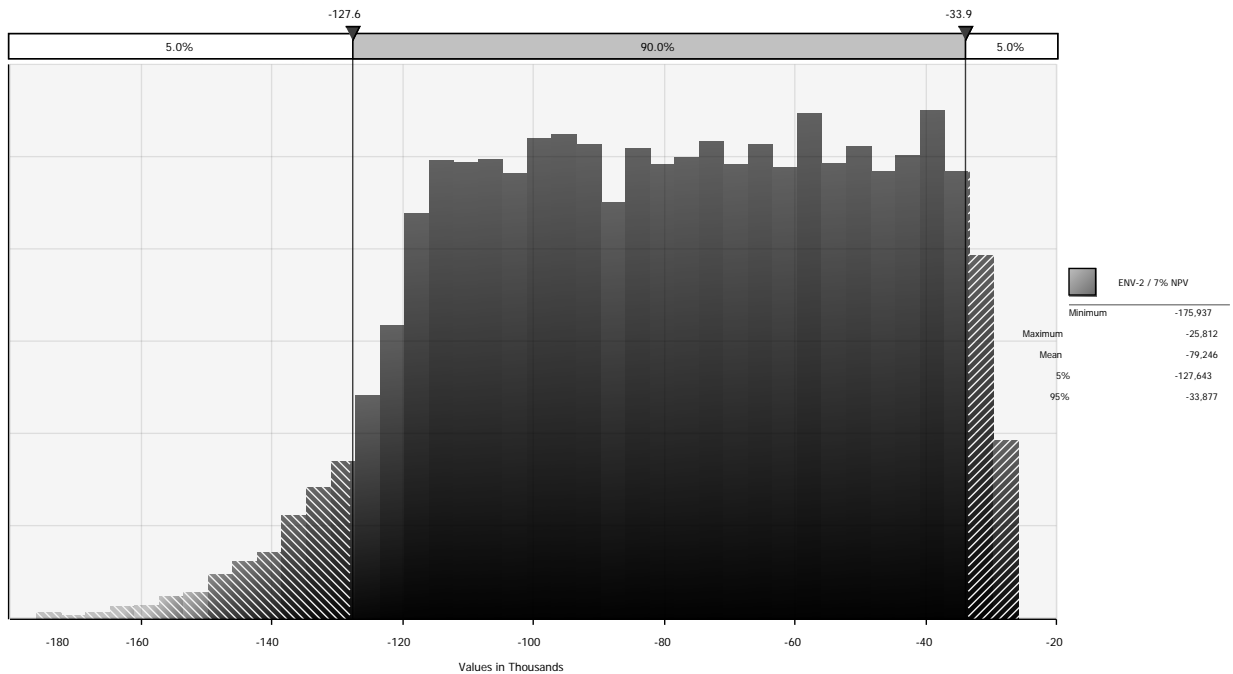


Figure 30 Variation of NRC cost due to the uncertainty in the cost input variables (Alternative ENV-2)

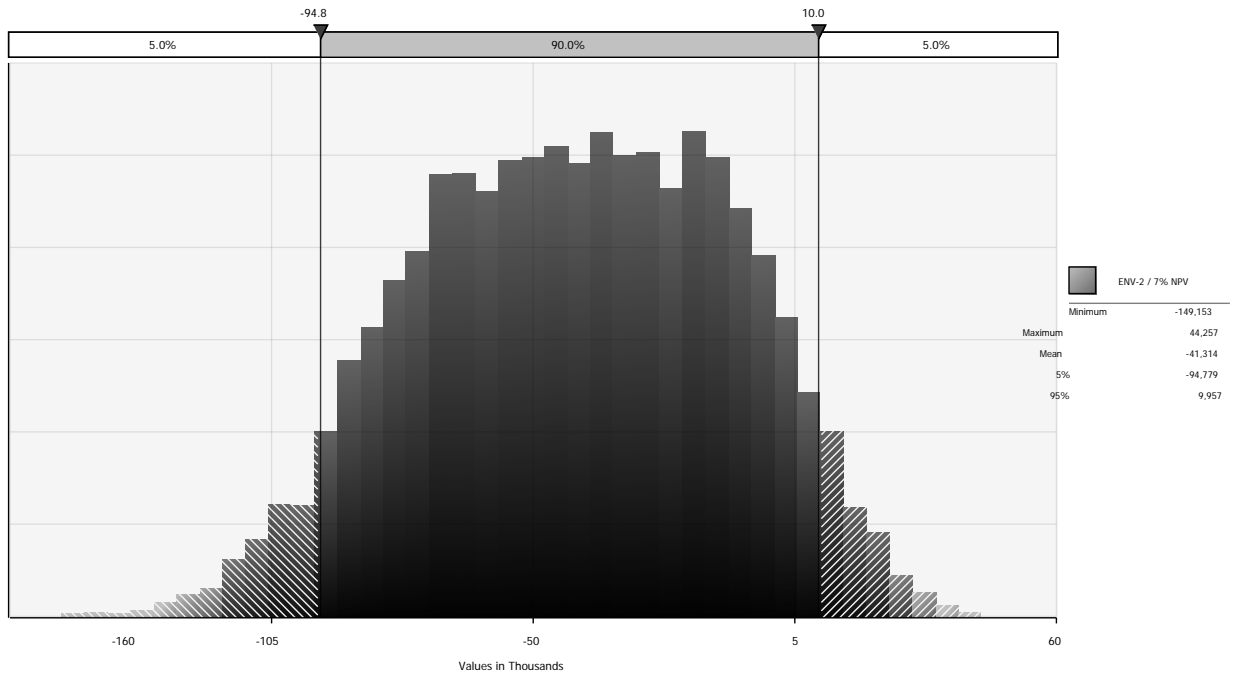


Figure 31 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cost input variables (Alternative ENV-2)

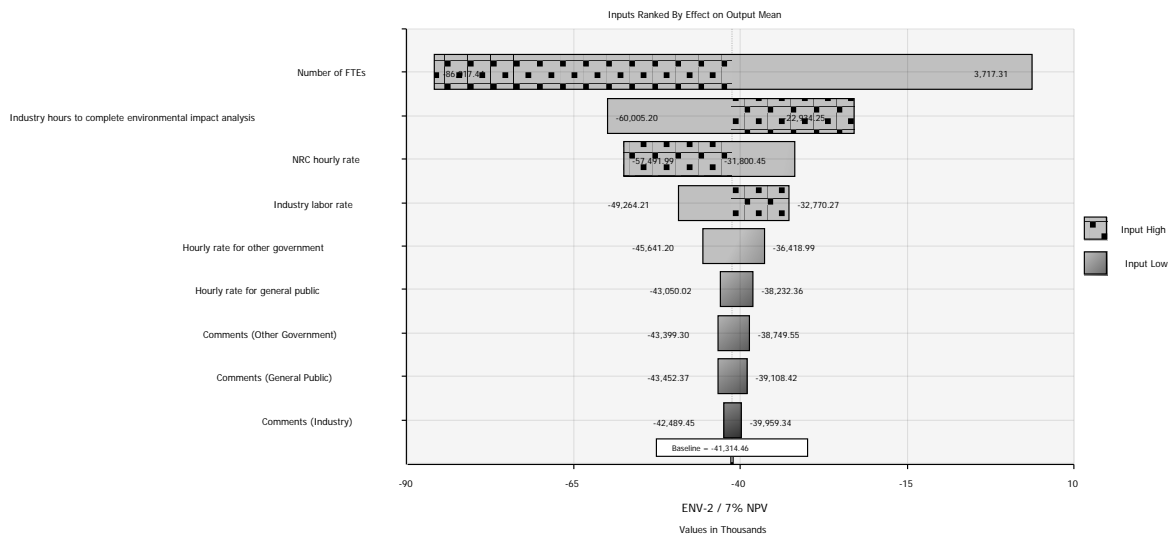


Figure 32 Tornado chart showing the variation of total cost due to each cost driver (Alternative ENV-2)

The regulatory changes to the Environmental Considerations area of decommissioning (Alternative ENV-2) will result in additional or averted costs to the industry, NRC, State and local governments and general public over the decommissioning period in the range of (\$149,000) to \$44,000 at 7 percent NPV. The cost driver that has the greatest influence on total cost for this alternative is the number of NRC FTEs to implement the rulemaking.

## 6.10.9 Record Retention Requirements

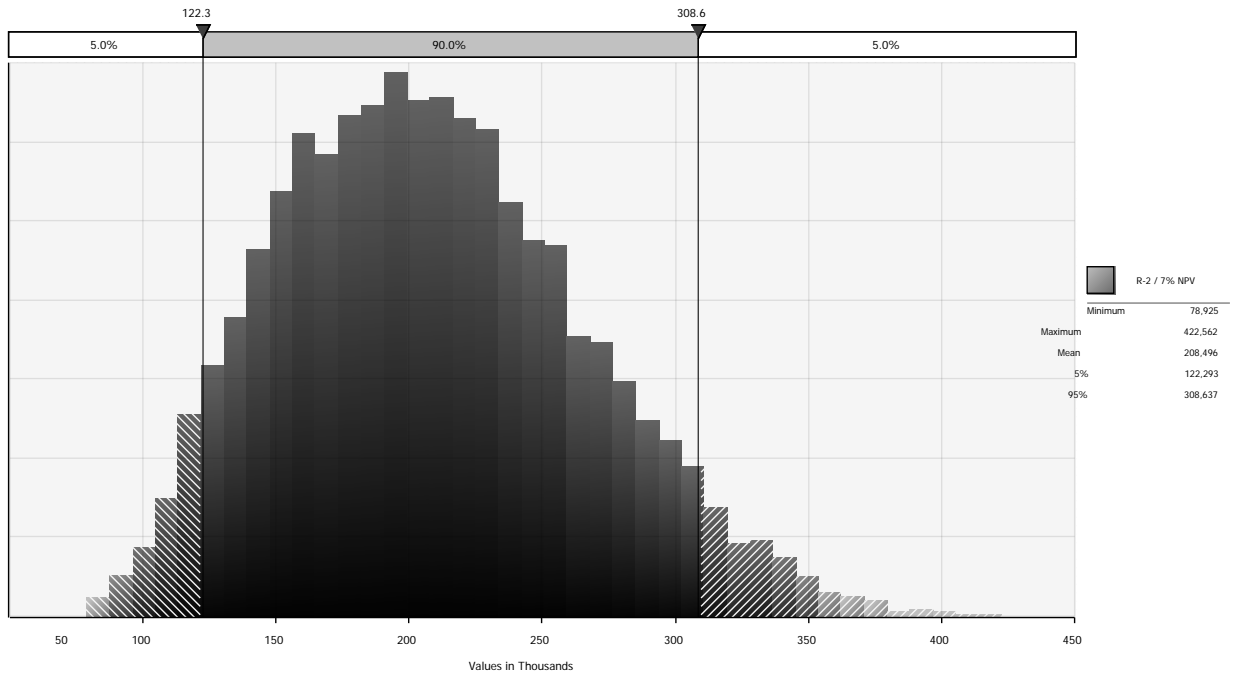


Figure 33 Variation of industry cost due to the uncertainty in the cost input variables (Alternative R-2)

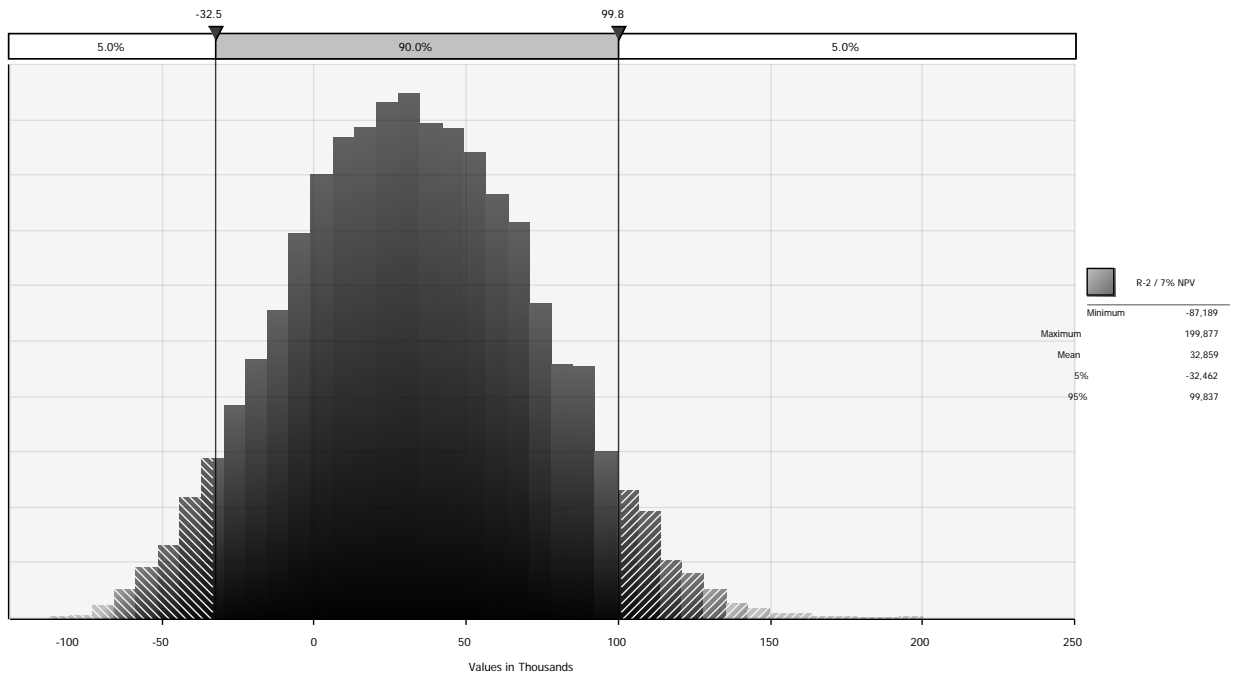


Figure 34 Variation of NRC cost due to the uncertainty in the cost input variables (Alternative R-2)

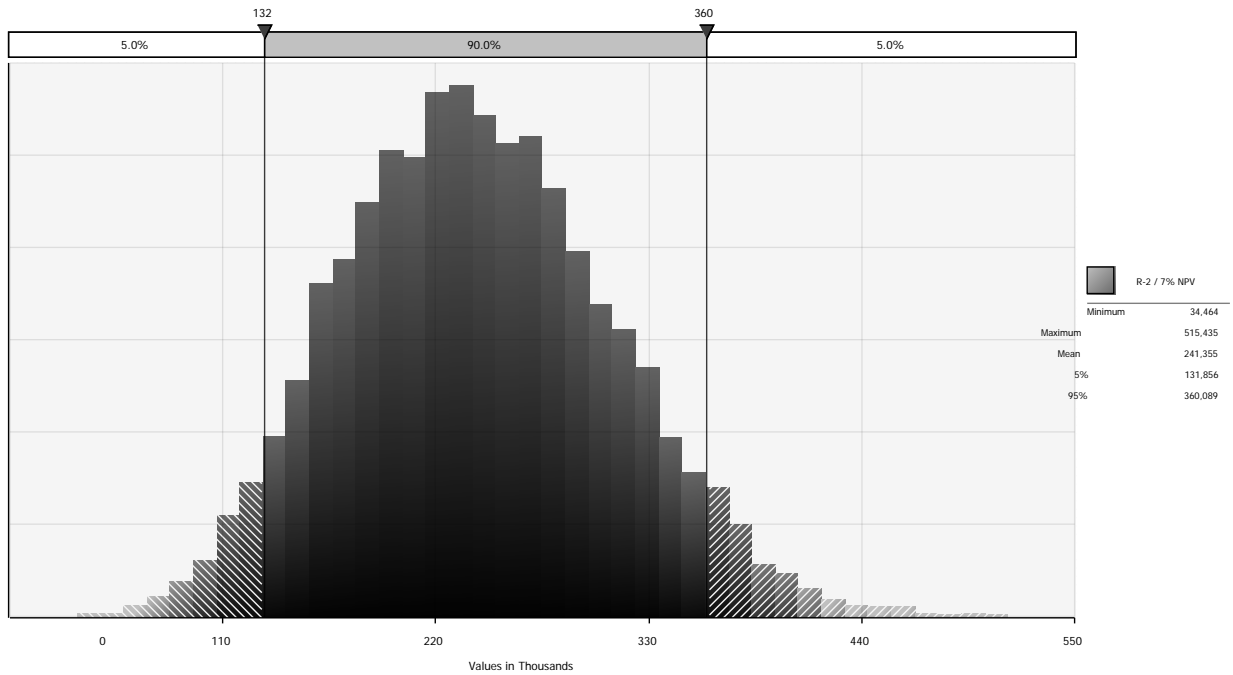


Figure 35 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cost input variables (Alternative R-2)

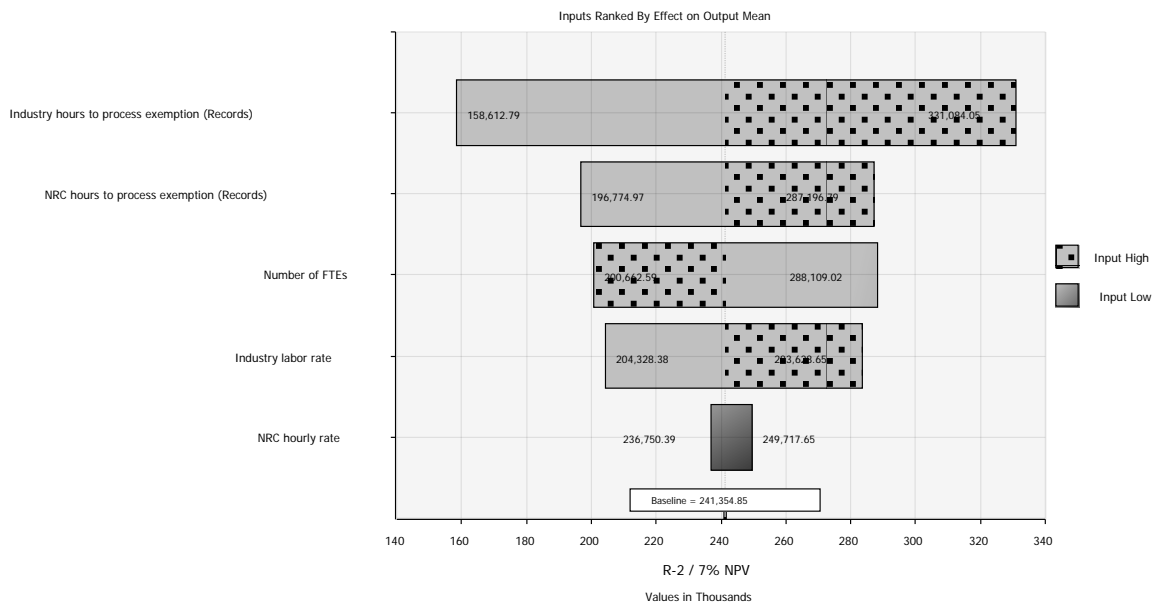


Figure 36 Tornado chart showing the variation of total cost due to each cost driver (Alternative R-2)

The regulatory changes to Alternative R-2 will result in cost savings to the industry and NRC over the decommissioning period in the range of \$34,000 to \$515,000 at 7 percent NPV. The cost drivers that have the greatest influence on total cost for this alternative are the number of industry and NRC hours to process exemptions from record keeping.



### 6.10.10 Low-Level Waste Transportation

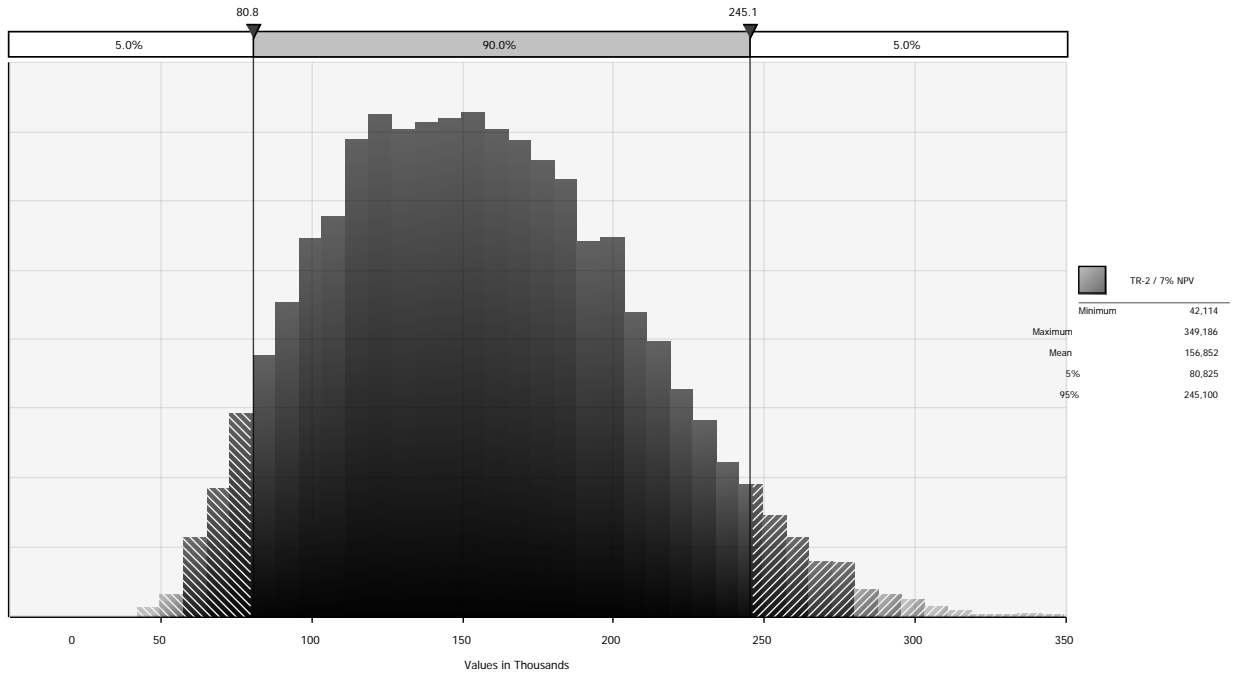


Figure 37 Variation of industry cost due to the uncertainty in the cost input variables (Alternative TR-2)

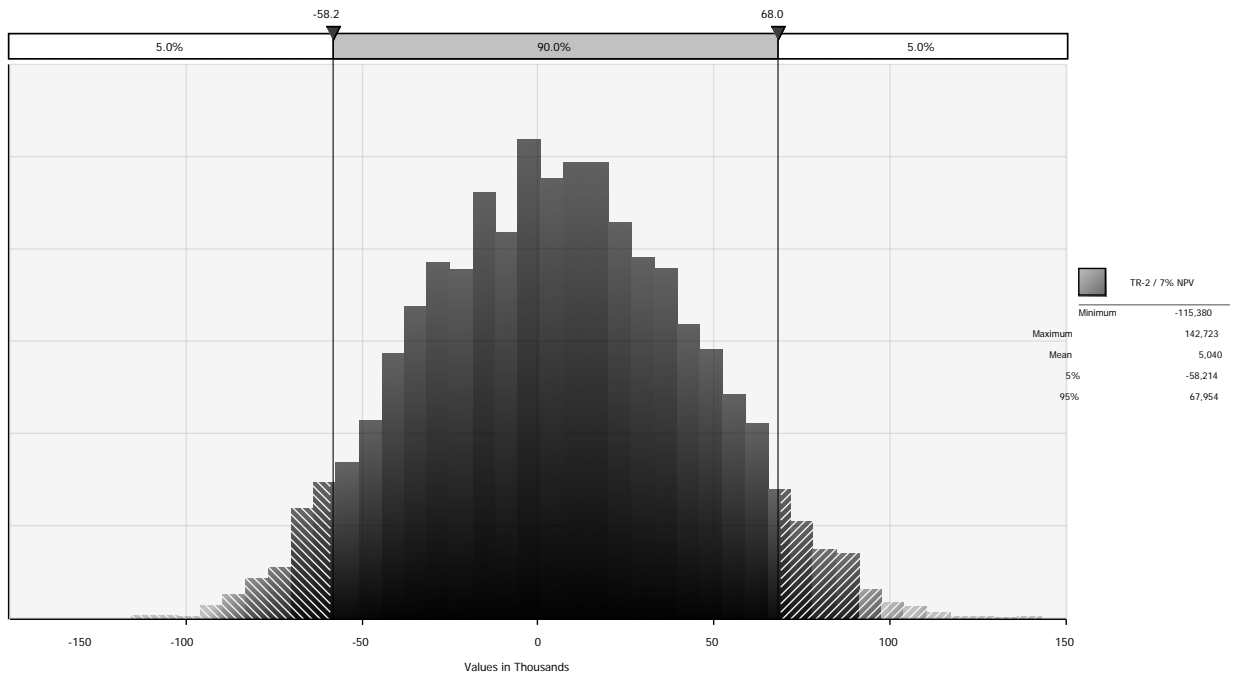


Figure 38 Variation of NRC cost due to the uncertainty in the cost input variables (Alternative TR-2)

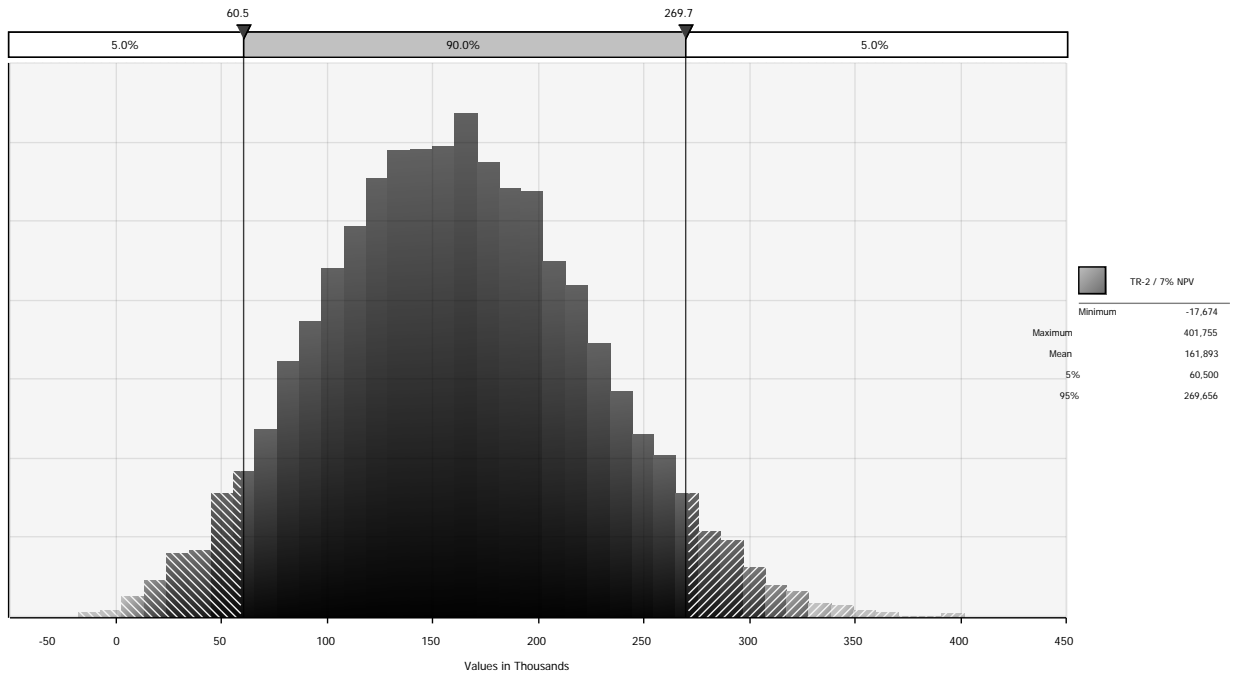


Figure 39 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cost input variables (Alternative TR-2)

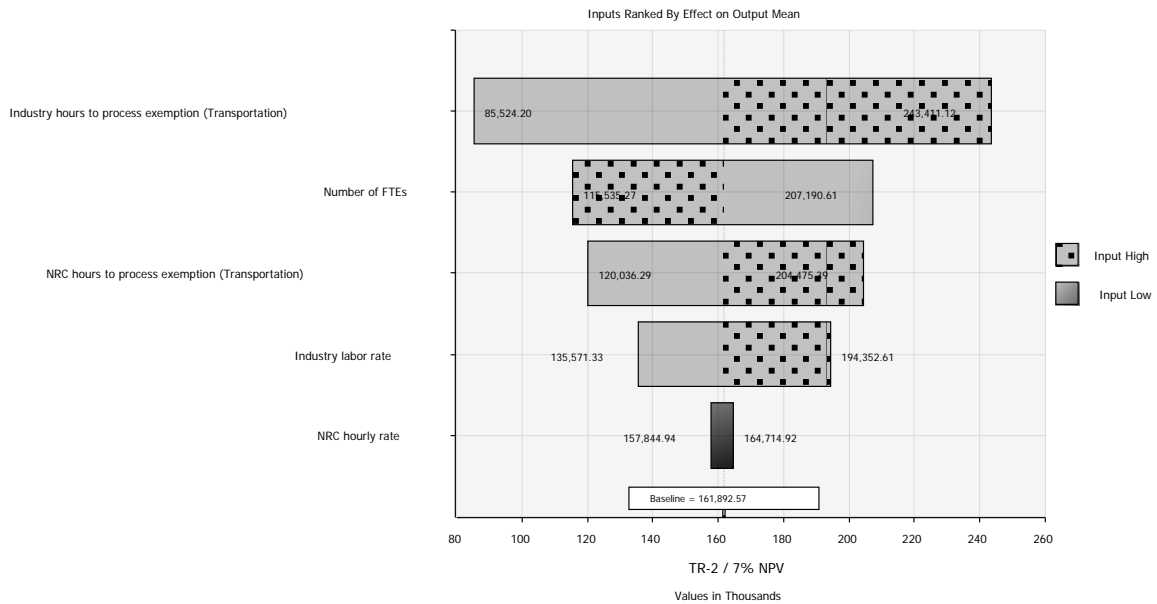


Figure 40 Tornado chart showing the variation of total cost due to each cost driver (Alternative TR-2)

The regulatory changes to Alternative TR-2 will result in cost savings to the industry and NRC over the decommissioning period in the range of (\$18,000) to \$402,000 at 7 percent NPV. The cost drivers that have the greatest influence on total cost for this alternative are the number of industry hours to process exemptions for transportation of low level waste and the number of NRC FTEs to implement the rulemaking.

## 6.10.11 Spent Fuel Management Planning

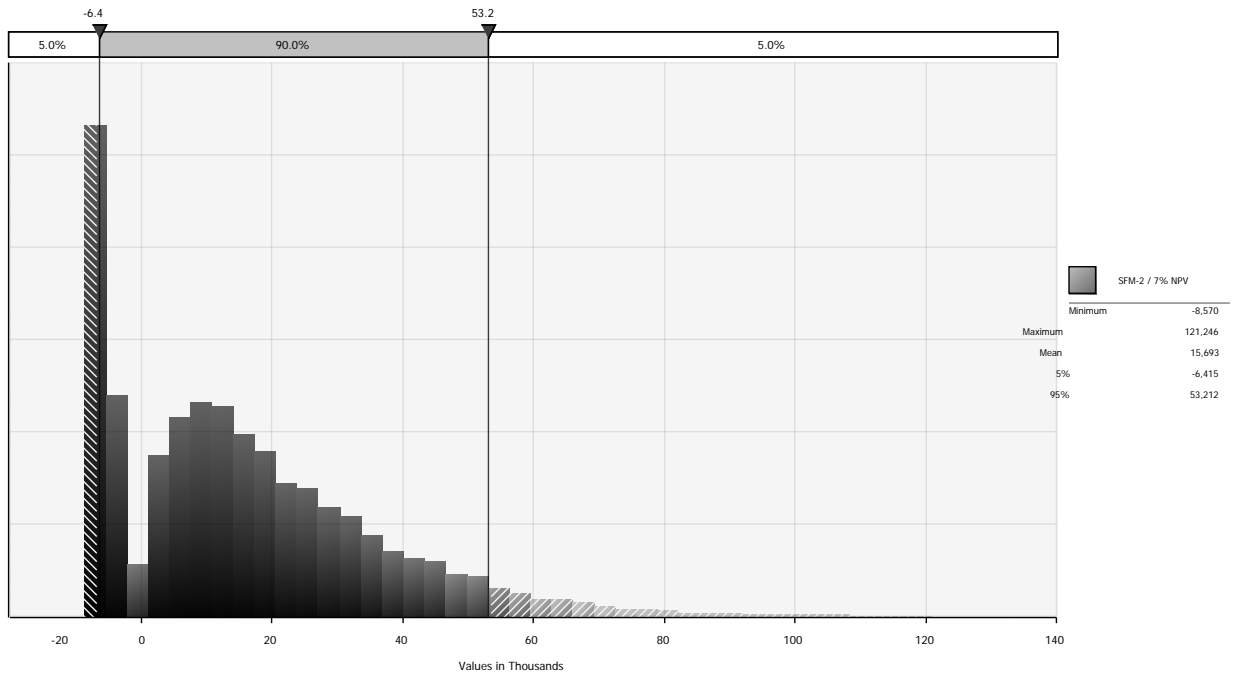


Figure 41 Variation of industry cost due to the uncertainty in the cost input variables (Alternative SFM-2)

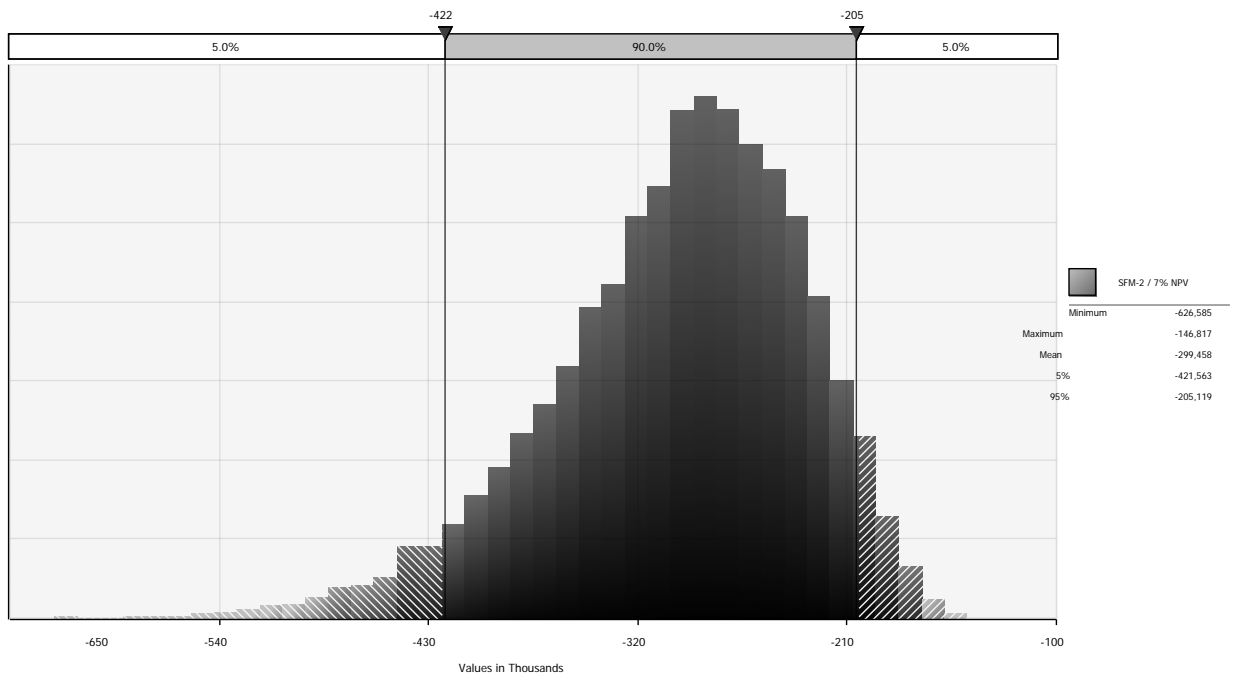


Figure 42 Variation of NRC cost due to the uncertainty in the cost input variables (Alternative SFM-2)

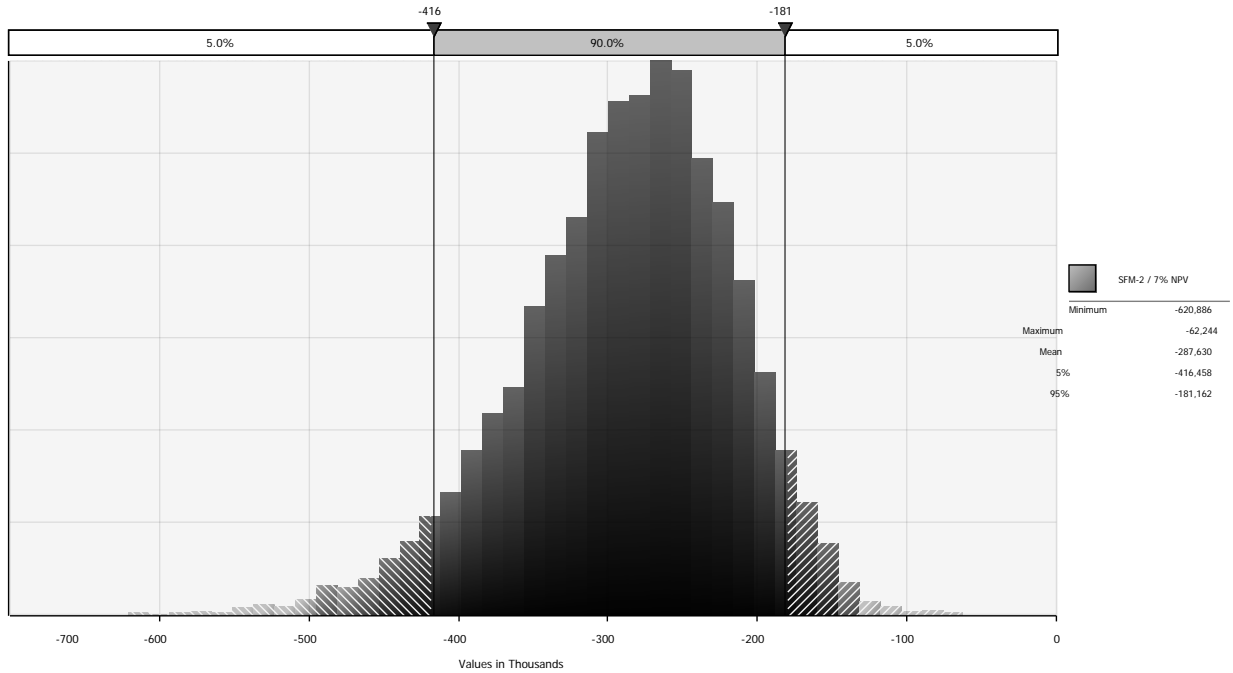


Figure 43 Variation of total cost (industry, NRC, State and local governments and general public) due to the uncertainty in the cost input variables (Alternative SFM-2)

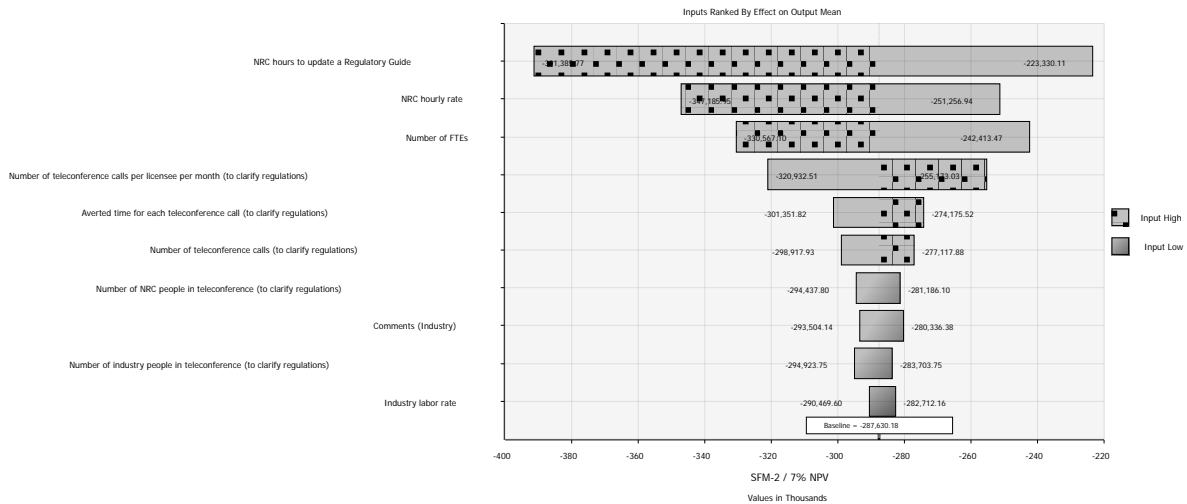


Figure 44 Tornado chart showing the variation of total cost due to each cost driver (Alternative SFM-2)

The regulatory changes to Alternative SFM-2 will result in costs to the industry, NRC, State and local governments and general public over the decommissioning period in the range of (\$621,000) to (\$62,000) at 7 percent NPV. The cost drivers that have the greatest influence on total cost for this alternative are the number of NRC hours to update the regulatory guides pertaining to this area and the NRC labor rate.

## 6.10.12 Backfit Rule

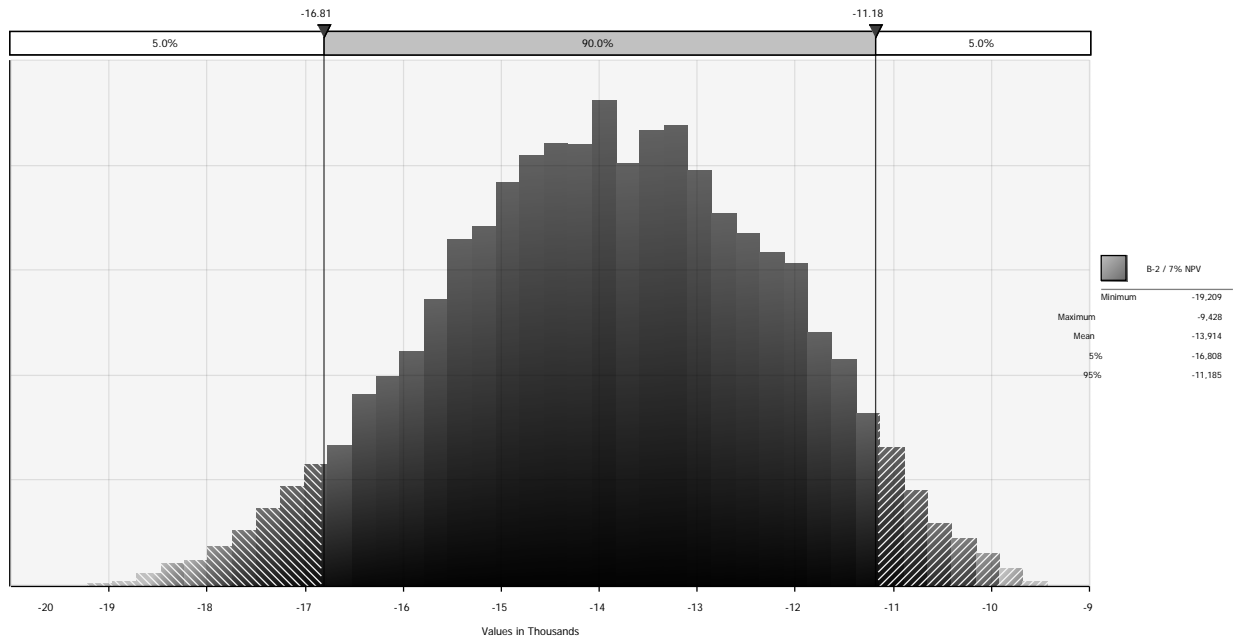


Figure 45 Variation of industry cost due to the uncertainty in the Backfit Rule cost drivers (Alternative B-2)

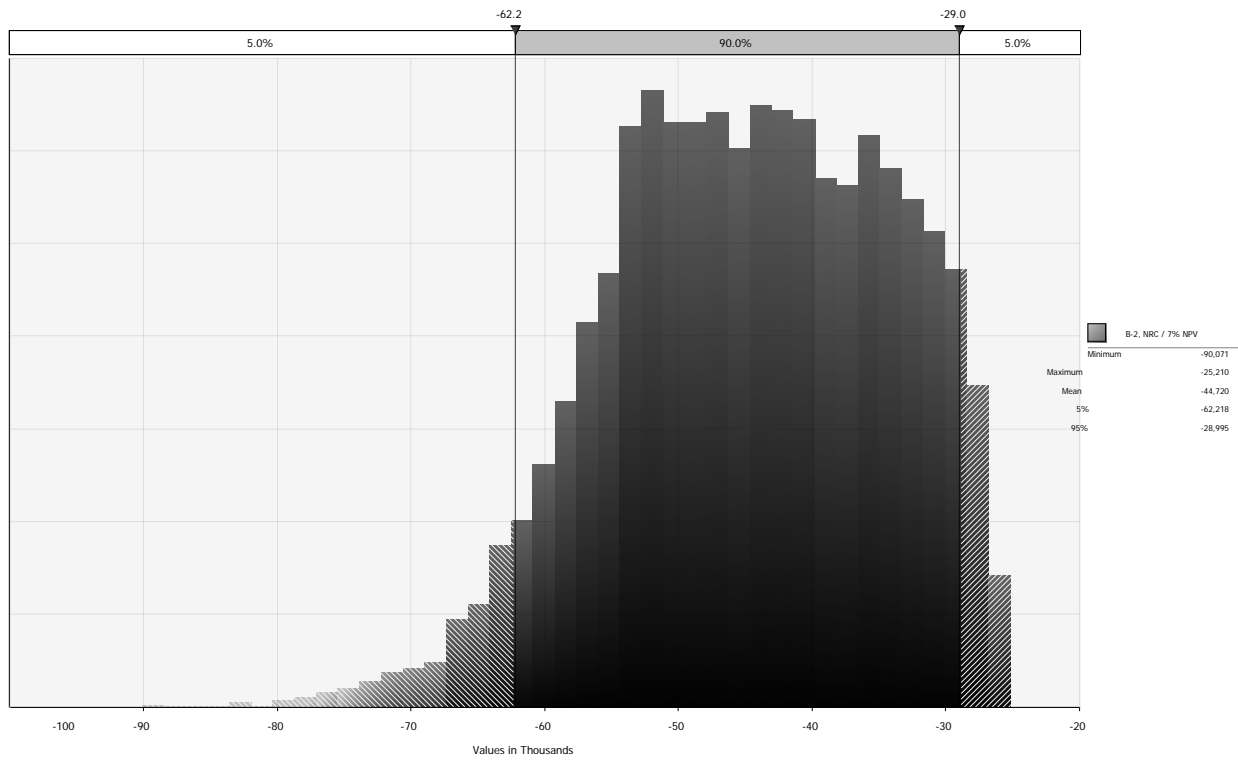


Figure 46 Variation of NRC cost due to the uncertainty in the Backfit Rule cost drivers (Alternative B-2)

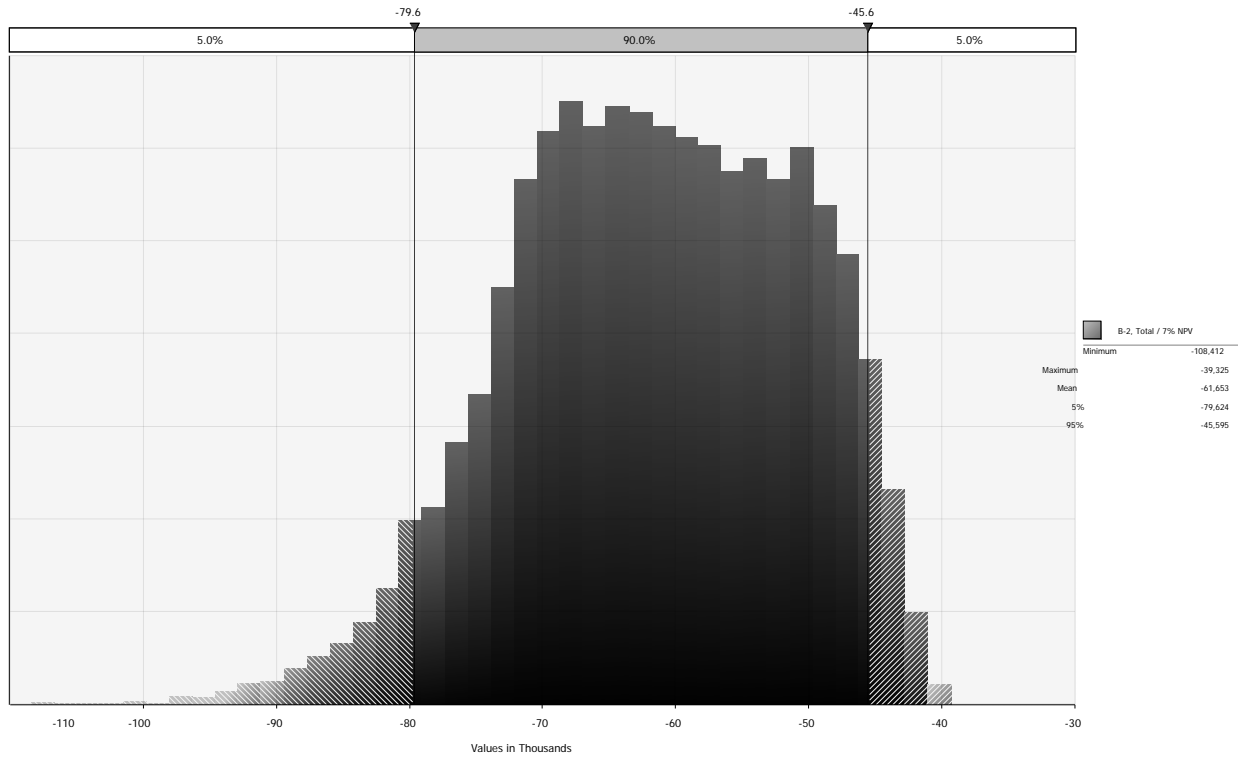


Figure 47 Variation of total cost due to the uncertainty in the Backfit Rule cost drivers (Alternative B-2)

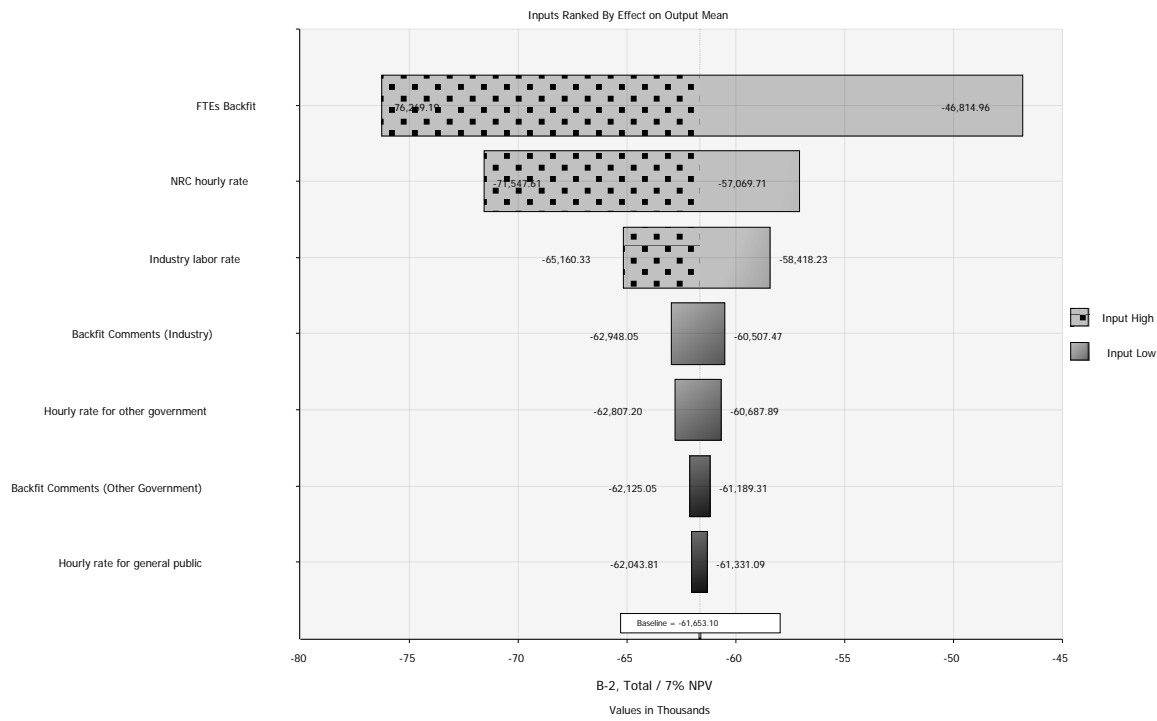


Figure 48 Tornado Chart showing the variation of total cost due to each Backfit Rule cost driver (Alternative B-2)

The regulatory changes to the Backfit Rule area of decommissioning (Alternative B-2) will result in costs to the industry, NRC, State and local governments and general public that is in the range of (\$315,000) to (\$128,000) using a 7 percent NPV. The cost drivers that have the greatest influence for Alternative B-2 are the number of hours it takes for the NRC to complete the rule and the NRC hourly labor rate.

### 6.10.13 Foreign Ownership, Control, or Domination (FOCD)

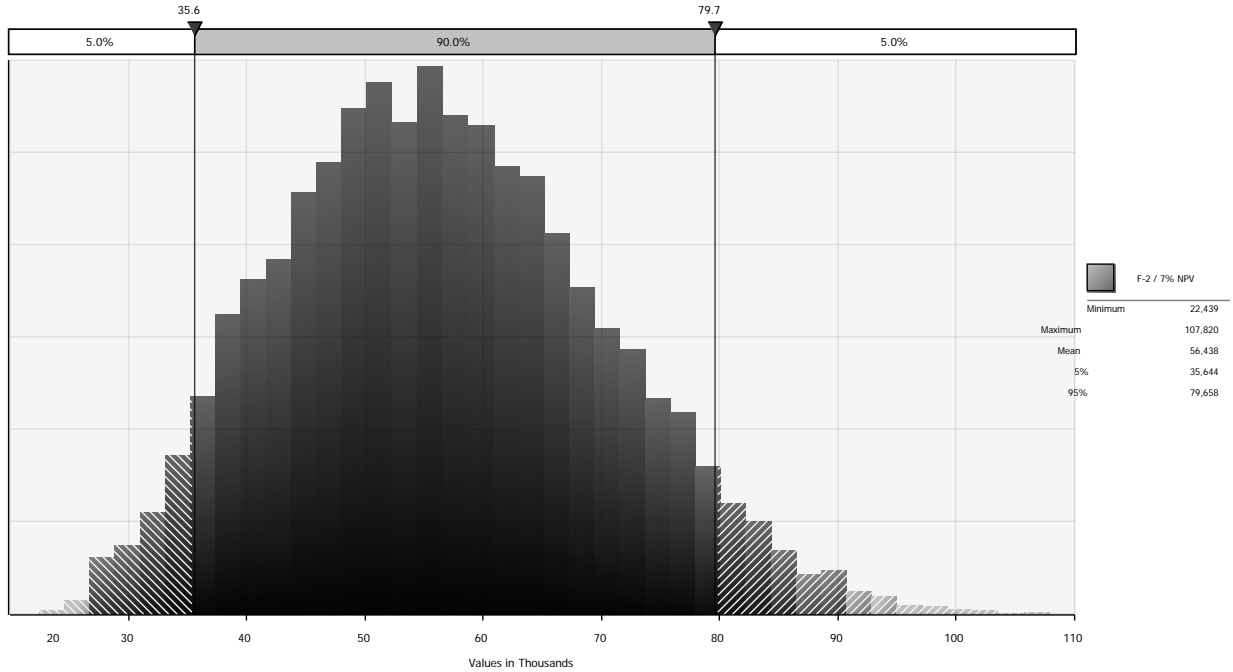


Figure 49 Variation of industry cost due to the uncertainty in the FOCD cost drivers (Alternative F-2)

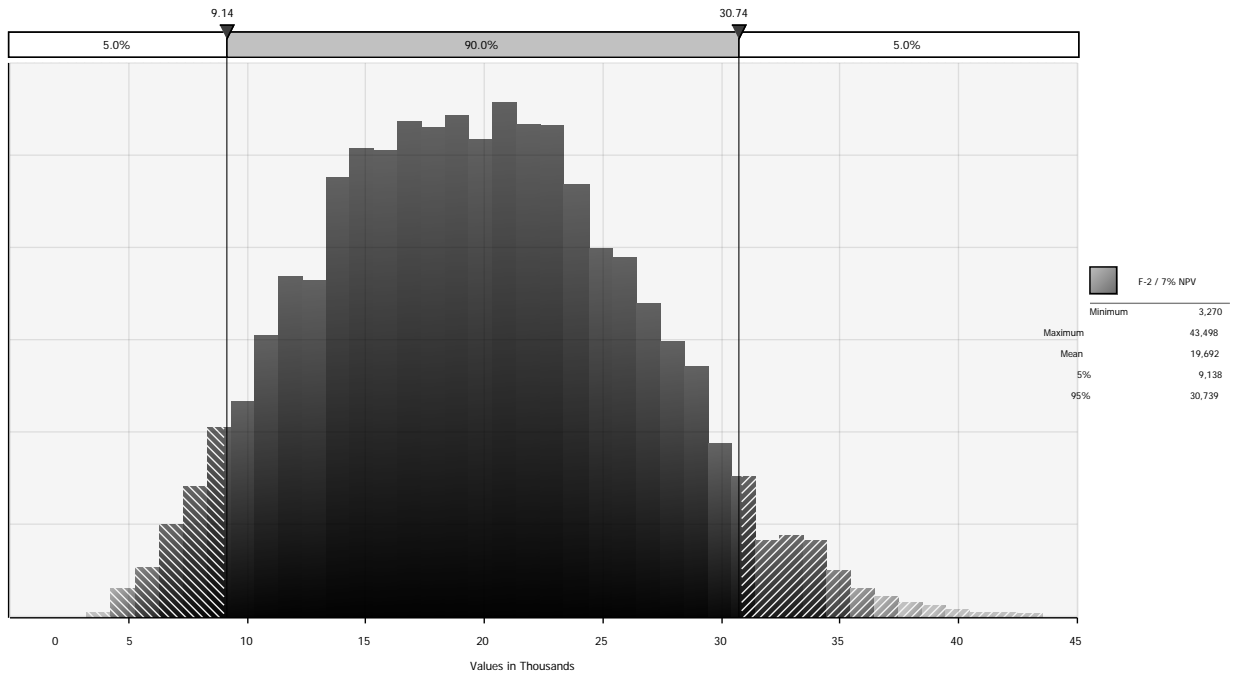


Figure 50 Variation of NRC cost due to the uncertainty in the FOCD cost drivers (Alternative F-2)

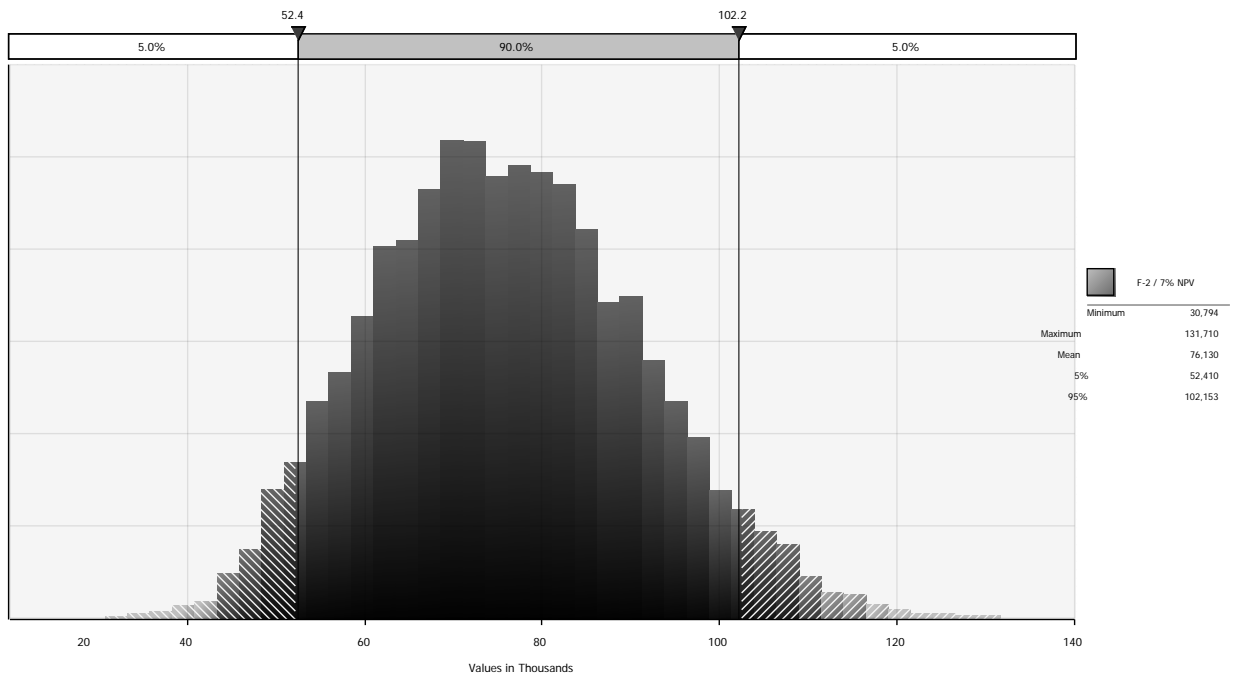


Figure 51 Variation of total cost due to the uncertainty in the FOCD cost drivers (Alternative F-2)



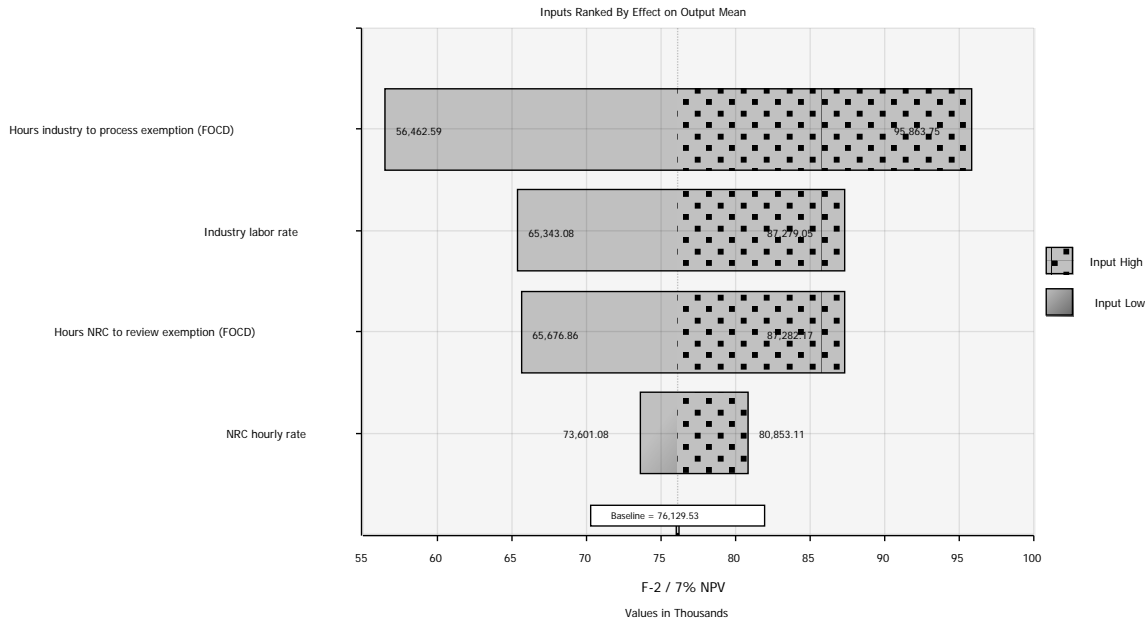


Figure 52 Tornado Chart showing the variation of total cost due to each FOCD cost driver (Alternative F-2)

The regulatory changes to the FOCD area of decommissioning (Alternative F-2) will result in cost savings to the industry and NRC that is in the range of \$31,000 to \$132,000 using a 7 percent NPV. The cost driver that has the greatest influence for Alternative F-2 is the number of hours it takes for the industry to process exemption requests.

## 6.11 Summary

This regulatory analysis identifies and integrates costs and benefits that will emerge from implementing the areas of decommissioning that contain rulemaking and guidance alternatives.

### 6.11.1 Quantified Net Benefit

The following tables show the estimated total net cost for the alternatives relative to the regulatory baseline (no-action alternatives) for each area of decommissioning.

Table 14 Cost and Benefits for Industry

Areas of Decommissioning	Alternatives	Industry Costs and Benefits		
		Undiscounted	7% NPV	3% NPV
Emergency Preparedness	EP-2	\$ 19,830,000	\$ 5,463,000	\$ 10,530,000
Physical Security	PS-2	\$ 3,341,000	\$ 914,000	\$ 1,770,000
Cybersecurity	CS-2	\$ (433,000)	\$ 133,000	\$ 116,000
Drugs and Alcohol Testing	DA-2	\$ 27,926,000	\$ 7,010,000	\$ 14,135,000
Certified Fuel Handler Training	CFH/STA-2	\$ 652,000	\$ 153,000	\$ 324,000
Decommissioning Funding Assurance	DTF-2	\$ 4,081,000	\$ 1,599,000	\$ 2,578,000
Offsite & Onsite Financial Protection	FP-2	\$ 1,705,000	\$ 467,000	\$ 903,000
Environmental Considerations	ENV-2	\$ 216,000	\$ 51,000	\$ 110,000
Record Retention Requirements	R-2	\$ 754,000	\$ 209,000	\$ 401,000
Low Level Waste Transportation	TR-2	\$ 567,000	\$ 157,000	\$ 302,000
Spent Fuel Management Requirements	SFM-2	\$ 40,000	\$ 9,000	\$ 20,000
Backfit Rule	B-2	\$ (13,000)	\$ (13,000)	\$ (13,000)
Foreign Ownership, Control, or Domination	F-2	\$ 204,000	\$ 56,000	\$ 109,000

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars.

Table 15 Cost and Benefits for NRC

Areas of Decommissioning	Alternatives	NRC Costs and Benefits		
		Undiscounted	7% NPV	3% NPV
Emergency Preparedness	EP-2	\$ 10,047,000	\$ 2,308,000	\$ 5,033,000
Physical Security	PS-2	\$ 1,577,000	\$ (33,000)	\$ 530,000
Cybersecurity	CS-2	\$ 192,000	\$ (50,000)	\$ 23,000
Drugs and Alcohol Testing	DA-2	\$ 393,000	\$ 15,000	\$ 143,000
Certified Fuel Handler Training	CFH/STA-2	\$ 1,287,000	\$ 219,000	\$ 584,000
Decommissioning Funding Assurance	DTF-2	\$ 1,917,000	\$ 478,000	\$ 1,050,000
Offsite & Onsite Financial Protection	FP-2	\$ 802,000	\$ 101,000	\$ 347,000
Environmental Considerations	ENV-2	\$ (82,000)	\$ (79,000)	\$ (81,000)
Record Retention Requirements	R-2	\$ 324,000	\$ 33,000	\$ 135,000
Low Level Waste Transportation	TR-2	\$ 223,000	\$ 5,000	\$ 81,000
Spent Fuel Management Requirements	SFM-2	\$ (311,000)	\$ (303,000)	\$ (311,000)
Backfit Rule	B-2	\$ (46,000)	\$ (45,000)	\$ (46,000)
Foreign Ownership, Control, or Domination	F-2	\$ 99,000	\$ 20,000	\$ 48,000

\* There may be discrepancies in calculations due to rounding.

\*\* All values are in 2018 dollars.

### 6.11.2 Qualitative Costs and Benefits

In addition to regulatory efficiency the alternatives provide additional costs and benefits as described below. These costs and benefits have not yet been quantified into monetary values:

#### *Emergency Preparedness:*

Alternative EP-2: The NRC and FEMA would establish a notification process that would replace the current NRC/FEMA process for terminating the assessment of FEMA user fees following the receipt from the NRC of approved exemptions from pertinent 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50 requirements stating that offsite radiological emergency planning and preparedness are no longer required at a particular commercial nuclear power plant site. The FEMA would also incur one-time costs to develop and issue a final rule to amend 44 CFR 354.4(e) to reflect this new process.

---

*Decommissioning Funding Assurance:*

Under Alternative DTF-2, licensees who report a shortfall pursuant to 10 CFR 50.75(f) would be required to make up the shortfall (from the minimum regulatory required amount as set forth in 10 CFR 50.75(c) or by the licensee's site-specific decommissioning cost estimate) before the next report is due. This requirement for making up DTF shortfalls would affect individual licensees differently, depending on the amount and cause of the DTF shortfall and the time period that the licensee would otherwise have had to make up the shortfall under the current regulatory framework. The greater the amount of money that must be funded to overcome the shortfall, the more significant the impact will be on the licensee. The combination of these two requirements could aggravate the licensee's financial condition if the licensee is unable to recover decommissioning costs through electrical generation rates and fees or through reductions in their operating plant budget. If the funding period were too short, licensees not under rate-setting regulations who report a shortfall would be placed at a competitive disadvantage, potentially leading to insolvency and premature shutdown of plants. The premature shutdown of a plant could result in a dramatic shortfall between the funds needed to decommission the plant and the funds that have been collected. Other possible effects of accelerated shortfall funding are interference with licensees' business planning or negative tax consequences.

## **6.12 Safety Goal Evaluation**

Safety goal evaluations are applicable to regulatory initiatives considered to be generic safety enhancement backfits subject to the substantial additional protection standard in 10 CFR 50.109(a)(3). A safety goal evaluation is designed to determine whether a regulatory requirement should not be imposed generically on nuclear power plants because the residual risk is already acceptably low.

This proposed rule would amend certain regulations affecting decommissioning production and utilization facilities. These amendments would reduce the number of exemption and license amendment requests submitted by licensees during the transition to decommissioning. The proposed rule would not enhance the safety of decommissioning facilities for the following areas of decommissioning: emergency preparedness, physical security, drug and alcohol testing, CFH/STA, decommissioning funding assurance, offsite and onsite financial protection and indemnity agreements, environmental considerations, record retention, low-level waste transportation, spent fuel management planning, backfit rule, FOCD, and clarification of the scope of license termination. Hence, a safety goal evaluation is not applicable to these areas of decommissioning.

Finally, as part of this proposed rule the NRC is proposing a modification to the cyber security requirement in 10 CFR 73.54. Every 10 CFR Part 50 license for an operating nuclear power reactor contains a license condition to have and maintain a Commission-approved cyber security plan (CSP). This license condition remains effective until the license is amended or terminated. The proposed rule provides a reduction in burden for these 10 CFR Part 50 licensees by removing the license condition after sufficient time has passed such that the spent fuel cannot heat up to clad ignition temperature within 10 hours under adiabatic conditions. Because this proposed requirement results in a reduction in burden while maintaining an equivalent level of adequate protection of the public health and safety and common defense and security, a safety goal evaluation is not appropriate for this rule provision.

---

Holders of a 10 CFR Part 52 combined license are currently required to maintain a cyber security program only as long as 10 CFR 73.54 is applicable to them. Because 10 CFR 73.54 no longer applies to the licensee once it is not authorized to operate a nuclear power reactor, and a power reactor licensee is not authorized to operate a nuclear power reactor during decommissioning, COL holders are not required to maintain their CSP during decommissioning. This proposed rule, which would require licensees to maintain their cyber security program for 10 months (BWR) or 16 months (PWR) beyond the date of permanent cessation of operations, could extend the duration over which a COL holder would be required to maintain a cyber security program. That extension would constitute a new or changed requirement for that licensee. Although the risk of a potential spent fuel radiological release is not quantified, the NRC has identified two qualitative benefits to the common defense and security and public health and safety that would be realized if the proposed violation of issue finality is implemented. Specifically, the NRC finds that extending the duration over which the licensee must maintain cyber security requirements would:

- Constitute a substantial increase in protection to common defense and security by ensuring that a compromise of digital systems cannot adversely impact the effective operation of licensees' physical security programs; and
- Constitute a substantial increase in public health and safety by ensuring that a compromise of digital systems cannot adversely impact the effective operation of emergency preparedness systems in the event of a zirconium fire scenario.

These two qualitative arguments satisfy the intent of the safety goal evaluation for the proposed changes to the cyber security requirements and demonstrate that the substantial additional protection standard in 10 CFR 50.109(a)(3) is met.

## **7 DECISION RATIONALE FOR THE AREAS OF DECOMMISSIONING**

This section discusses the proposed rulemaking alternative for each area of decommissioning that would be the most cost beneficial to the nuclear power industry, local, state, and US governments and general public. The NRC has established a decision rationale for each area of decommissioning with respect to the proposed rulemaking and this section will present these decision rationales, their costs, and their benefits.

For all areas that are being considered in the proposed decommissioning rulemaking, a quantitative cost benefit analysis was completed to inform the staff of those alternatives that provide the most cost-beneficial solutions. The following subsections present the decision rationales for each of the areas that are being considered in the proposed rulemaking, along with a quantitative and qualitative description of the alternatives.

The regulatory analysis finds that there is a quantitative and qualitative basis for pursuing the decommissioning rulemaking based on the following:

### **Emergency Preparedness:**

- The proposed rule provides the opportunity for significant averted costs over Alternative EP-1, the no-action alternative.
- Regulatory burden on nuclear power plant licensees would be reduced by eliminating the need to submit requests for exemptions and license amendments for EP requirements that pertain to operating reactors. This also reduces the need for the NRC to review these exemption and amendment submittals.

---

Physical Security:

- The proposed rule provides the opportunity for significant averted costs over Alternative PS-1, the no-action alternative.
- Regulatory burden on nuclear power plant licensees would be reduced by eliminating the need to submit security-related exemption and license amendment requests for nuclear power reactors during their transition period to a decommissioning status. This also reduces the need for the NRC to review these exemptions and amendment submittals.

Cyber Security:

- The proposed rule would clarify the cyber security requirements applicable to a nuclear power reactor during each stage of the decommissioning process. Additionally fewer license amendment requests regarding reduction or elimination of cyber security requirements in 10 CFR 73.54 would be submitted by the licensees as a result of this proposed rule.

Fitness for Duty - Drug and Alcohol Testing:

- The proposed rule would clarify which elements of the FFD program defined in Part 26 would be applicable to an operating or decommissioning power reactor through the licensee's insider mitigation program. As a result, the number of personnel that undergo drug and alcohol testing at a decommissioning site would be reduced, resulting in cost savings to the nuclear power industry.

Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor:

- The proposed rule would provide consistency in the regulatory treatment of the training programs for NLOs (which do not require Commission approval) and training programs to qualify a NLO as a CFH (which do require Commission approval). The second change would clarify that an STA is not required for decommissioning reactors. These changes would provide clarity to the CFH's responsibilities and functions and eliminate the role of an STA by codifying current licensing practices.

Decommissioning Funding Assurance:

- The need for future exemption requests would be reduced given that clear regulatory requirements would be in place to assure adequate funding for decommissioning earlier in a facility's lifecycle. These changes to the regulatory framework would align with the current decommissioning environment where commingling of funds in the DTF is allowed under guidance but silent in regulation.
- Regulatory efficiency would be improved through minimizing uncertainty associated with estimating decommissioning costs such that a licensee would be required to plan for, and provide assurances for, funding decommissioning to a site-specific cost estimate earlier in the facility's lifecycle. Shortfalls would be addressed in a timely manner by licensees with greater transparency on these actions.
- Provides greater transparency of a licensee's decommissioning costs and plans for funding at licensing, and throughout operations and decommissioning, while also providing a measure of flexibility for the use of funds in the DTF.

Offsite and Onsite Financial Protection Requirements and Indemnity Agreements:

- Regulatory burden on nuclear reactor licensees would be reduced by eliminating the need to submit requests for exemptions for reductions in onsite and offsite financial

---

protection. This would also reduce the need for the NRC to review these exemption submittals.

Environmental Considerations:

- The proposed rule would clarify that licensees, at the PSDAR stage, are required to evaluate the environmental impacts and provide in the PSDAR the basis for whether or not the proposed decommissioning activities are bounded by previously issued, site-specific environmental reviews. Licensees would no longer be required to make the definitive conclusion that impacts will be bounded. Instead, they would have the flexibility to address any unbounded environmental impacts closer to, but prior to, the decommissioning activity being undertaken that could cause the unbounded impact.

Record Retention Requirements:

- The proposed rule would decrease the burden associated with long term record storage and increase the overall efficiency of the decommissioning process.

Low Level Waste Transportation:

- The proposed rule would eliminate the need for exemption requests pertaining to the 20 day receipt notification of transfer of low level radioactive waste.

Spent Fuel Management Planning:

- The proposed rule would improve the efficiency of the NRC's oversight of the decommissioning process, by reducing the NRC staff's time in engaging with the licensee to clarify what reactor SSCs are needed for managing spent fuel and responding to frequent stakeholder inquiries in this area.

Backfit Rule:

- The proposed rule would clarify how the Backfit Rule applies to licensees in decommissioning. This would lead to less time spent on a generic or plant specific backfit analysis that pertains to decommissioning.

Foreign Ownership, Control, or Domination (FOCD):

- The proposed rule would make it clear that the regulations in Part 50, and similar regulations in Part 52, provide not only for the licensing of utilization and production facilities, but also for decommissioning and the termination of their associated licenses. The proposed rule would also identify those requirements needed for a Part 50 or Part 52 licensed facility that does not meet the definition of a utilization or production facility, such that it could be transferred to a foreign entity.

Clarification of Scope of License Termination Plan Requirement:

- The proposed rule would clarify that the requirement for a license termination plan in § 50.82(a)(9) and § 52.110(i) applies only to power reactor licensees that commenced operation and eliminate the apparent confusion among combined license holders who seek to surrender their licenses before operation.

Relative to the regulatory baseline, the NRC would realize additional costs to implement the proposed rulemaking, however this regulatory analysis shows that the above areas will result in quantitative and qualitative benefits as discussed below. In addition, the rulemaking alternatives would help ensure that the NRC's actions are effective, efficient, realistic, and timely by eliminating the need for the NRC review of exemption and amendment requests that are submitted for those licensees that are transitioning from operations to decommissioning.

---

## **7.1 Emergency Preparedness**

The NRC is proposing rulemaking Alternative EP-2 over the no-action alternative (status quo), because it would provide regulatory certainty for emergency preparedness requirements for permanently shutdown and defueled facilities. Also, in status quo, decommissioning power reactor licensees would need to submit exemption and amendment requests in order to reduce their emergency preparedness requirements throughout the decommissioning process. This would result in regulatory burden and costs to the licensees and the NRC during the decommissioning process from resources being expended to process the exemption and amendment requests. Additionally, Alternative EP-2 would provide a graded approach to reduce emergency preparedness requirements at decommissioning sites. Finally, the cost benefit analysis shows that this alternative is cost beneficial. The final recommendation, however, will be informed by public comments received on the proposed rule. The NRC proposes that an amendment of the regulations to provide a graded approach to EP, Alternative EP-2 as the best course of action. This alternative would provide a regulatory process for licensees to reduce their EP requirements corresponding to the licensee's level of decommissioning without the need to consider whether the change is a reduction in effectiveness.

## **7.2 Physical Security**

The NRC is proposing rulemaking Alternative PS-2 over the no-action alternative (status quo) because the risk of offsite consequences due to accidents is reduced at a decommissioning reactor when compared to that at an operating reactor. Given the reduced risk of offsite consequences, the NRC has concluded that existing physical security requirements can be stepped down commensurate with the reduced level of risk. Also regulatory burden on nuclear power plant licensees would be reduced by eliminating the need to submit requests for exemptions and license amendments for reducing their physical security-related requirements during decommissioning. This alternative will also reduce the need for the NRC to review these exemptions and amendment requests and is shown to be cost beneficial.

## **7.3 Cyber Security**

The NRC is proposing rulemaking Alternative CS-2. Under this alternative, the NRC would undertake a rulemaking to only allow the removal of cyber security requirements from a power reactor licensee's license once spent fuel in the SFP has sufficiently decayed. This change to existing regulation would provide clarity as to the degree of cyber security that needs to be maintained during each stage of the decommissioning process, while ensuring that safety concerns (e.g., a postulated zirconium fire scenario) are properly addressed in a manner that provides reasonable assurance of adequate protection of public health and safety, and the common defense and security.

## **7.4 Drug and Alcohol Testing**

The NRC is proposing rulemaking Alternative DA-2. The cost benefit analysis shows that rulemaking Alternative DA-2 results in cost savings to industry and NRC as detailed in Table 16. The benefit derived from pursuing this alternative is regulatory clarity on which elements of the

---

FFD program defined in Part 26 would be applicable to a decommissioning power reactor through the licensee's insider mitigation program.

### **7.5 Certified Fuel Handler Definition and Elimination of the Shift Technical Advisor**

The NRC is proposing rulemaking Alternative CFH/STA-2. The cost-benefit analysis shows that Alternative CFH/STA-2 results in a benefit to both industry and the NRC. The benefit derived from pursuing rulemaking Alternative CFH/STA-2 is the elimination of the need for a licensee to seek Commission approval for the CFH training program for a decommissioning reactor. This rulemaking alternative would reduce resources expended by both the licensee and the NRC regarding Commission approval of CFH training programs. Therefore, the NRC proposes proceeding with the rulemaking Alternative CFH/STA-2. This is also consistent with feedback received from the public on the regulatory basis.

### **7.6 Decommissioning Funding Assurance**

The NRC is proposing rulemaking Alternative DTF-2. Alternative DTF-2 has the following benefits over the no-action alternative (status quo):

- The need for future exemption requests is reduced given that clear regulatory requirements would address the concept of commingling as described in NRC Regulatory Information Summary (RIS) 2001-07 (Ref. 47). Presently, licensees would need to file for an exemption to utilize the commingling concept when they don't follow NRC guidance.
- The reporting requirements for decommissioning funding assurance under 10 CFR 50.75(f)(1) and (f)(2) would be changed from a biennial to a triennial reporting period to be consistent with the reporting requirements for ISFSIs in 10 CFR 72.30(c). This would reduce the burden on the licensees for reporting.
- Rulemaking would allow for greater transparency of a licensee's decommissioning costs and plans for funding at licensing, and throughout operations and decommissioning, while also providing a measure of flexibility for the use of funds in the DTF. This would minimize the uncertainty associated with estimating decommissioning costs such that a licensee would be able to plan for, and provide assurances for, funding decommissioning earlier in the facility's lifecycle. Shortfalls would be addressed in a timely manner by licensees with greater transparency on these actions.

As detailed in Table 16, Alternative DTF-2 presents a cost benefit at 7 percent NPV and at 3 percent NPV. The NRC therefore proposes to proceed with the rulemaking Alternative DTF-2.

### **7.7 Offsite and Onsite Financial Protection Requirements and Indemnity Agreements**

The NRC is proposing rulemaking Alternative FP-2 over the no-action alternative (status quo) because the risk of offsite and onsite consequences due to a potential nuclear occurrence is reduced at a decommissioning reactor when compared to that at an operating reactor and the amounts of financial protection provided in Levels 1 and 2 are consistent with exemptions that



---

have been granted to reactors that have decommissioned. Given the reduced risk of offsite and onsite consequences, the NRC has concluded that existing insurance requirements can be stepped down commensurate with the reduced level of risk and graded to emergency preparedness. Also regulatory burden on nuclear reactor licensees is reduced by eliminating the need to submit exemptions for reduction to onsite and offsite financial protection. This will also reduce the need for the NRC to review these exemption requests.

## **7.8 Environmental Considerations**

The NRC is proposing rulemaking Alternative ENV-2, given the NRC's desire to reduce unnecessary regulatory burden and improve the regulatory process for decommissioning nuclear power plants. Implementation of ENV-2 would allow the NRC and stakeholders to access more detailed information in the PSDARs for those licensees choosing to follow the enhanced guidance. This would not reduce the flexibility provided by the use of a PSDAR instead of a decommissioning plan for decommissioning nuclear power plants or impose unnecessary burdens on licensees and the NRC to create and review additional documents that do not have any net positive impact on public health and safety.

Alternative ENV-2, would clarify, through rulemaking, that licensees must evaluate the environmental impacts associated with site-specific decommissioning activities and determine whether such impacts are bounded by appropriate previously issued environmental impact statements, rather than being required to make a definitive conclusion that all such impacts are bounded by appropriate previously issued environmental impact statements in the PSDAR. The 10 CFR 50.82(a)(6)(ii) and 10 CFR 52.110(f)(2) prohibitions against conducting a decommissioning activity that would result in a significant environmental impact not previously reviewed remains in place although clarifying language is added (under the proposed rule, the prohibition applies to a decommissioning activity not bounded by federally issued environmental review documents).

## **7.9 Record Retention Requirements**

The NRC is proposing rulemaking Alternative R-2, based on the preliminary assessment of the costs and benefits for changing decommissioning recordkeeping and record retention requirements. Under this alternative, decommissioning licensees would have a decreased burden resulting from not having to develop and submit exemptions and would achieve greater record storage efficiency throughout the decommissioning process. While some NRC resources would need to be expended in the near term to revise the regulations, the reduction in recordkeeping and record retention exemption requests would reduce the NRC's time necessary to process and review these exemptions during decommissioning in the long term. Although these changes would not directly affect public health and safety, the increased clarity of the requirements associated with recordkeeping and record retention during decommissioning would increase the overall transparency of the decommissioning process.

## **7.10 Low-Level Waste Transportation**

The NRC is proposing rulemaking Alternative TR-2, given the NRC's desire to maintain safety, reduce unnecessary regulatory burden, and improve efficiency and effectiveness in the regulatory process for decommissioning nuclear power plants. Under this alternative, licensees would have a decreased burden resulting from not having to develop and submit the subject exemption requests and would achieve greater efficiency throughout the LLW transportation

---

process. While some NRC resources would need to be expended in the near term to revise the 10 CFR Part 20, Appendix G regulation, the reduction in requests for exemptions from the LLW transportation investigation, tracing, and reporting requirements would reduce the NRC's time necessary to process and review these exemptions. Although these changes would not directly affect public health and safety, the reduction in administrative burden associated with the LLW transportation investigation, tracing, and reporting requirements, during both facility operation and decommissioning, would increase the overall efficiency of the regulatory process.

### **7.11 Spent Fuel Management Planning**

The NRC is proposing rulemaking Alternative SFM-2, where the NRC would amend 10 CFR 50.82, 10 CFR 50.54(bb), 10 CFR 52.110, and 10 CFR 72.218 to clarify and update the regulations as previously described, as well as to enhance overall regulatory transparency and openness. The NRC estimates that this change would have a small impact on both licensees and the NRC since it would only require the NRC to promulgate rule language that is already present in other sections of 10 CFR Chapter I and simply move it into the appropriate portions of 10 CFR 50.82, 10 CFR 50.54(bb), and 10 CFR 52.110. In addition, decommissioning licensees would need to expend a relatively small amount of time and effort to provide the additional level of detail and information suggested under the adjusted requirements for spent fuel management and handling capabilities during decommissioning since most of these considerations are already being taken into account at decommissioning facilities.

With these regulation changes detailed in Alternative SFM-2 above, the NRC concludes that both the NRC and licensees would save resources in the future since the clarified regulations and additional detail in the guidance would reduce or potentially eliminate the NRC's need to engage in site-specific interactions with the licensee to clarify information regarding the management of spent fuel during decommissioning. It would also improve the efficiency of NRC communications with various stakeholders who have questions and concerns in this area. Additionally, Alternative SFM-2 would enhance the opportunity for public involvement in the decommissioning process, as well as expanding overall regulatory transparency and openness. Furthermore, Alternative SFM-2 resolves the identified inconsistencies within the regulations. Hence the NRC proposes Alternative SFM-2 to clarify the spent fuel management requirements.

### **7.12 Backfit Rule**

The NRC is proposing rulemaking Alternative B-2 over Alternative B-1 (status quo). The cost benefit analysis however shows that Alternative B-2 results in costs to both industry and the NRC due solely to the development of the rule. The benefit derived from pursuing rulemaking Alternative B-2 is regulatory clarity for how the backfit rule would apply to decommissioning plants. This may lead to less time spent by industry and the NRC for determining what regulatory action applied to a decommissioning licensee is or is not a backfit. Here the scope of activities and approvals that would continue from the operations phase into a decommissioning phase would be determined.

### **7.13 Foreign Ownership, Control, or Domination (FOCD)**

The NRC is proposing rulemaking Alternative F-2 over Alternative F-1 (status quo) in order to clarify that the regulations in Part 50, and the similar regulations in Part 52, provide not only for the licensing of utilization and production facilities, but also for their decommissioning and the termination of their associated licenses. The proposed rule will also allow foreign entities to

directly invest in Part 50 and Part 52 licensees consistent with maintaining the common defense and security and the public health and safety. This will reduce the number of exemptions from § 50.38 for facilities that no longer meet the definition of a utilization or production facility, thus resulting in cost savings to the nuclear power industry and NRC. Additionally the proposed rule would offer the NPUFs the option to request only one licensing action—the decommissioning plan license amendment—that also would address the licensee’s operating authority, rendering a “possession-only license amendment” unnecessary and resulting in cost savings to NPUFs and the NRC from lack of processing these amendments.

## 7.14 Clarification of Scope of License Termination Plan Requirement

The NRC is proposing rulemaking Alternative T-2 over Alternative T-1 (status quo) in order to clarify that combined license holders who seek to surrender their licenses before operation do not need to submit a license termination plan to the NRC for approval. Since the rulemaking alternative is a clarification in the language of § 50.82(a)(9) and § 52.110(i), there would not be a significant change in the costs and benefits to the industry, NRC, State and local governments and the general public due to this rulemaking alternative.

## 8 NRC PROPOSED RULE

The following table summarizes the NRC alternatives for the proposed rule along with their incremental costs. The total incremental cost for the alternatives under proposed rule is also displayed. The following table provides the quantified and non-quantified costs and benefits for each proposed alternative in each area of decommissioning for specific decommissioning topics. These costs include burden to the Federal, State, local governments and the General Public due to public commenting periods.

Table 16 Summary of Total Costs and Benefits for the Recommended Alternatives

Areas of Decommissioning	Alternatives	Total Costs and Benefits	
		7% NPV	3% NPV
Emergency Preparedness	EP-2	\$ 7,740,000	\$ 15,530,000
Physical Security	PS-2	\$ 877,000	\$ 2,296,000
Cybersecurity	CS-2	\$ 83,000	\$ 140,000
Drugs and Alcohol Testing	DA-2	\$ 7,025,000	\$ 14,278,000
Certified Fuel Handler Training	CFH/STA-2	\$ 370,000	\$ 906,000
Decommissioning Funding Assurance	DTF-2	\$ 2,062,000	\$ 3,613,000
Offsite & Onsite Financial Protection	FP-2	\$ 564,000	\$ 1,247,000
Environmental Considerations	ENV-2	\$ (41,000)	\$ 15,000
Record Retention Requirements	R-2	\$ 241,000	\$ 536,000
Low Level Waste Transportation	TR-2	\$ 162,000	\$ 383,000
Spent Fuel Management Planning	SFM-2	\$ (299,000)	\$ (296,000)
Backfit Protection	B-2	\$ (61,000)	\$ (62,000)
Foreign Ownership, Control, or Domination	F-2	\$ 76,000	\$ 156,000
<b>Total:</b>		\$ 18,799,000	\$ 38,742,000
<b>Nonmonetary Benefits</b>			
<b>Regulatory Efficiency:</b> These alternatives would enable the NRC to better maintain and administer regulatory activities over the decommissioning process and ensure that the requirements for decommissioning power reactors are clear and appropriate.			
<b>Safety and Common Defense:</b> These alternatives would continue to provide reasonable assurance of adequate protection of the public health, safety, and common defense and security at nuclear power reactor sites that have started decommissioning.			

\* There may be discrepancies in calculations due to rounding.

---

\*\* All values are in 2018 dollars.

Should the alternatives result in a final rule, the cost benefit analysis shows that these alternatives are overall cost beneficial to the nuclear power industry, Federal, State and local governments and the general public and that the revised requirements would result in a net averted cost from \$18.8 million (7-percent NPV) to \$38.7 million (3-percent NPV). Most of the cost savings are attributable to the relief of exemptions and amendments that licensees would typically submit to the NRC for review and approval during decommissioning. The additional costs would be primarily due to efforts to conduct the rulemaking, update documents associated with the rulemaking (i.e. regulatory guidance and NUREGs) and to manage the response to public comments.

## **9 GUIDANCE DOCUMENTS**

The NRC is currently revising the following guidance documents for the proposed rule:

- RG 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors"
- RG 1.184, "Decommissioning of Nuclear Power Reactors"
- RG 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report (PSDAR)"

During the course of the rulemaking, the NRC will draft a new regulatory guide, Draft Guide (DG)-1346, "Emergency Planning for Decommissioning Nuclear Power Reactors."

The NRC has identified that the following guidance documents are subject to revision based on decisions made to pursue regulatory actions, including rulemaking:

- RG 1.219, "Guidance on Making Changes to Emergency Plans for Nuclear Power Reactors"
- RG 1.179, "Standard Content and Format of License Termination Plans for Nuclear Power Reactors"
- RG 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning"
- RG 4.22, "Decommissioning Planning During Operations"
- RG 5.71, "Cyber Security Programs for Nuclear Facilities"
- RG 5.66, "Access Authorization for Nuclear Power Plants"
- RG 5.77, "Insider Mitigation Program"
- NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities"
- NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73"

- 
- NUREG-1496, “Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities”
  - NUREG-1555, “Standard Review Plans for Environmental Reviews for Nuclear Power Plants”
  - NUREG-1628, “Staff Responses to Frequently Asked Questions Concerning Decommissioning of Nuclear Power Plants”
  - NUREG-1700, “Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans”
  - NUREG-1727, “NMSS Decommissioning Standard Review Plan”
  - NUREG-1757, “Consolidated Decommissioning Guidance”
  - NSIR/DPR-ISG-01, “Interim Staff Guidance: Emergency Planning for Nuclear Power Plants”
  - Inspection Procedure 82501, “Decommissioning Emergency Preparedness Program Evaluation”
  - Inspection Procedure 82401, “Decommissioning Emergency Preparedness Scenario Review and Exercise Evaluation”

---

## REFERENCES

1. 53 FR 24018; “General Requirements for Decommissioning Nuclear Facilities: Final Rule,” June 27, 1988.
2. 60 FR 37374, “Decommissioning of Nuclear Power Reactors: Proposed Rule,” July 20, 1995.
3. 61 FR 39278, “Decommissioning of Nuclear Power Reactors: Final Rule,” July 29, 1996.
4. U.S. Nuclear Regulatory Commission, SRM-SECY 99-168, “Staff Requirements—SECY 99 168—Improving Decommissioning Regulations for Nuclear Power Plants,” December 21, 1999, ADAMS Accession No. ML003752190.
5. U.S. Nuclear Regulatory Commission, NUREG-1738, “Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants,” February, 2001, ADAMS Accession No. ML010430066.
6. U.S. Nuclear Regulatory Commission, SECY-00-0145, “Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning,” June 28, 2000, ADAMS Accession No. ML003721626.
7. U.S. Nuclear Regulatory Commission, SECY-01-0100, “Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools,” June 4, 2001, ADAMS Accession No. ML011450420.
8. U.S. Nuclear Regulatory Commission, SRM-SECY-14-0118, “Staff Requirements—SECY 14 0118—Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements,” December 30, 2014, ADAMS Accession No. ML14364A111.
9. U.S. Nuclear Regulatory Commission, SECY-15-0014, “Anticipated Schedule and Estimated Resources for a Power Reactor Decommissioning Rulemaking,” January 30, 2015, ADAMS Accession No. ML15082A089 (redacted).
10. 82 FR 13778, “Regulatory Improvements for Power Reactors Transitioning to Decommissioning: Draft Regulatory Basis,” March 15, 2017.
11. 82 FR 21481, “Regulatory Improvements for Power Reactors Transitioning to Decommissioning: Preliminary Draft Regulatory Analysis,” May 9, 2017.
12. 82 FR 55954, “Regulatory Improvements for Power Reactors Transitioning to Decommissioning: Regulatory Basis,” November 27, 2017.
13. U.S. Nuclear Regulatory Commission, Regulatory Analysis Document, “Regulatory Improvements for Power Reactors Transitioning to Decommissioning,” ADAMS Accession No. ML17332A075.

- 
14. World Nuclear Association, "Decommissioning Nuclear Facilities," Web page, updated September 8, 2017, accessed at <http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/decommissioning-nuclear-facilities.aspx>.
  15. U.S. Nuclear Regulatory Commission, NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook," January 1997, ADAMS Accession No. ML050190193.
  16. *U.S. Code of Federal Regulations*, Title 44, Emergency Management and Assistance, Part 350, "Review and Approval of State and Local Radiological Emergency Plans and Preparedness," Washington, DC.
  17. *U.S. Code of Federal Regulations*, Title 44, Emergency Management and Assistance, Part 354, "Fee for Services to Support FEMA's Offsite Radiological Emergency Preparedness Program," Washington, DC.
  18. U.S. Nuclear Regulatory Commission, "Kewaunee Power Station—Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation," October 27, 2014, ADAMS Accession No. ML14261A223.
  19. U.S. Nuclear Regulatory Commission, "Crystal River Unit 3—Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation," March 30, 2015, ADAMS Accession No. ML15058A906.
  20. U.S. Nuclear Regulatory Commission, "San Onofre Nuclear Generating Station, Units 1, 2, and 3 and Independent Spent Fuel Storage Installation—Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation," June 4, 2015, ADAMS Accession No. ML15082A204.
  21. U.S. Nuclear Regulatory Commission, "Vermont Yankee Nuclear Power Station—Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation," December 10, 2015, ADAMS Accession No. ML15180A054
  22. U.S. Department of Homeland Security, Federal Emergency Management Agency, FEMA P-1028, "Program Manual: Radiological Emergency Preparedness," January 2016.
  23. U.S. Nuclear Regulatory Commission, NSIR/DPR-ISG-02, "Interim Staff Guidance: Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants," May 11, 2015.
  24. NUREG-0654/FEMA-REP-1, Revision 1, Table B-1.
  25. 76 FR 72560, "Enhancements to Emergency Preparedness Regulations: Final Rule," November 23, 2011.
  26. NUREG-0654/FEMA-REP-1, Revision 1.
  27. Presentation by NorthStar and Entergy for January 24, 2017 public meeting on the proposed license transfer of Vermont Yankee for decommissioning, ADAMS Accession No. ML17019A145.

- 
28. U.S. Congress, Office of Technology Assessment (1993), Aging Nuclear Power Plants: Managing Plant Life and Decommissioning, pg. 92.
  29. IP 41501, "Review of Training and Qualification Programs," April 27, 2016
  30. U.S. Nuclear Regulatory Commission, SECY 93-127, "Financial Protection Required of Licensees of Large Nuclear Power Plants during Decommissioning," May 10, 1993, ADAMS Accession No. ML12257A628.
  31. U.S. Nuclear Regulatory Commission, SRM-SECY 93-127, "Financial Protection Required of Licensees of Large Nuclear Power Plants during Decommissioning," July 13, 1993, ADAMS Accession No. ML003760936.
  32. U.S. Nuclear Regulatory Commission, SECY 96-256, "Changes to Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w)(1) and 10 CFR 140.11," December 17, 1996, ADAMS Accession No. ML15062A483.
  33. U.S. Nuclear Regulatory Commission, SRM-SECY 96-256, "Changes to Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w)(1) and 10 CFR 140.11," January 28, 1997, ADAMS Accession No. ML15062A454
  34. U.S. Nuclear Regulatory Commission, NUREG-0586, Supplement 1, Volumes 1 and 2, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors," November 30, 2002, ADAMS Accession No. ML023470327
  35. U.S. Nuclear Regulatory Commission, Management Directive 8.4, "Management of Facility-Specific Backfitting Information Collection," October 9, 2013, ADAMS Accession No. ML12059A460.
  36. 78 FR 58571, "Maine Yankee Atomic Power Company, Connecticut Yankee Atomic Power Company, and The Yankee Atomic Electric Company: Exemption; Issuance," September 24, 2013
  37. 52 FR 38077, "Commission Policy Statement on Deferred Plants," October 14, 1987
  38. 81 FR 43266, "Final Procedures for Conducting Hearings on Conformance With the Acceptance Criteria in Combined Licenses," July 1, 2016
  39. U.S. Nuclear Regulatory Commission, NUREG/BR 0058, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," Revision 5, Draft for Public Comment, April 2017, ADAMS Accession No. ML17100A480.
  40. U.S. Office of Management and Budget, Circular No. A-4, "Regulatory Analysis," September 17, 2003, accessed at [https://obamawhitehouse.archives.gov/omb/circulars\\_a004\\_a-4/](https://obamawhitehouse.archives.gov/omb/circulars_a004_a-4/).
  41. U.S. Office of Management and Budget, Circular No. A-94, "Guideline and Discount Rates for Benefit-Cost Analysis of Federal Programs," accessed at <https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A94/a094.pdf>
-



- 
42. U.S. Department of Labor, Bureau of Labor Statistics, "Table 24, Historical Consumer Price Index for All Urban Consumers (CPI-U): U.S. City Average, All-Items," <https://www.bls.gov/cpi/tables/supplemental-files/historical-cpi-u-201802.pdf>.
  43. United States Congressional Budget Office, "The Budget and Economic Outlook: 2017 to 2027," Table 2 1, "CBO's Economic Projections for Calendar Years 2017 to 2027" January 2017, <https://www.cbo.gov/publication/52370>.
  44. U.S. Nuclear Regulatory Commission, NUREG/CR 4627, Revision 2, "Generic Cost Estimates," February 1992, ADAMS Accession No. ML13137A259.
  45. Omaha Public Power District, "Certification of Permanent Cessation of Power Operations," June 24, 2016, ADAMS Accession No. ML16176A213.
  46. U.S. Nuclear Regulatory Commission, NUREG-1350, Volume 29, "Information Digest 2017–2018," Appendix G, "Commercial Nuclear Power Reactor Operating Licenses—Expiration by Year, 2013–2049," August 2017.
  47. NRC Regulatory Issue Summary 2001-07, Revision 1, "10 CFR 50.75 Reporting and Recordkeeping for Decommissioning Planning," January 8, 2009, ADAMS Accession No. ML083440158.
  48. U.S. Department of Labor, Bureau of Labor Statistics, "NAICS Code: North American Industry Classification System Code," accessed at <http://www.bls.gov/bls/naics.htm>.
  49. U.S. Department of Labor, Bureau of Labor Statistics, "SOC Code: Standard Occupational Classification Code," accessed at <http://www.bls.gov/soc/home.htm>.

## APPENDIX A: INDUSTRY LABOR RATES

### Utilities (Sector 22)—Industry: Electric Power Generation, Transmission and Distribution (NAICS code 221100)

Position Title	Occupation (SOC Code)	Hourly Mean Wage (2017 dollars)	Hourly 10th Percentile Wage (2017 dollars)	Hourly 90th Percentile Wage (2017 dollars)	Source
Executive	Top Executives (111000)	\$82.90	\$55.33	\$107.77	<a href="http://www.bls.gov/oes/current/oes111011.htm">http://www.bls.gov/oes/current/oes111011.htm</a>
	Chief Executives (111011)	\$107.38	\$73.99	\$139.59	<a href="http://www.bls.gov/oes/current/oes_nat.htm#11-0000">http://www.bls.gov/oes/current/oes_nat.htm#11-0000</a>
	<b>Average</b>	<b>\$95.14</b>	<b>\$64.66</b>	<b>\$123.68</b>	
Managers	First-Line Supervisors of Production and Operating Workers (511011)	\$44.49	\$31.65	\$64.36	<a href="http://www.bls.gov/oes/current/oes511011.htm">http://www.bls.gov/oes/current/oes511011.htm</a>
	First-Line Supervisors of Mechanics Installers and Repairers (491011)	\$43.89	\$36.29	\$60.57	<a href="http://www.bls.gov/oes/current/oes491011.htm">http://www.bls.gov/oes/current/oes491011.htm</a>
	Industrial Production Managers (113051)	\$61.67	\$47.10	\$90.44	<a href="http://www.bls.gov/oes/current/oes113051.htm">http://www.bls.gov/oes/current/oes113051.htm</a>
	General and Operations Managers (111021)	\$68.24	\$48.81	\$88.71	<a href="http://www.bls.gov/oes/current/oes111021.htm">http://www.bls.gov/oes/current/oes111021.htm</a>
	<b>Average</b>	<b>\$54.57</b>	<b>\$40.96</b>	<b>\$76.02</b>	
Technical Staff	Nuclear Engineers (172161)	\$51.46	\$42.46	\$71.60	<a href="http://www.bls.gov/oes/current/oes172161.htm">http://www.bls.gov/oes/current/oes172161.htm</a>
	Computer Support Specialists (151150)	\$33.54	\$24.84	\$50.12	<a href="http://www.bls.gov/oes/">http://www.bls.gov/oes/</a>
	Nuclear Technicians (194051)	\$40.87	\$32.38	\$56.36	<a href="http://www.bls.gov/oes/current/oes194051.htm">http://www.bls.gov/oes/current/oes194051.htm</a>
	Nuclear Power Reactor Operators (518011)	\$46.22	\$39.45	\$61.37	<a href="http://www.bls.gov/oes/current/oes518011.htm">http://www.bls.gov/oes/current/oes518011.htm</a>
	Industrial Machinery Mechanics (499041)	\$33.94	\$26.58	\$47.61	<a href="http://www.bls.gov/oes/current/oes499041.htm">http://www.bls.gov/oes/current/oes499041.htm</a>
	<b>Average</b>	<b>\$41.21</b>	<b>\$33.14</b>	<b>\$57.41</b>	
Admin Staff	Office and Administrative Support Occupations (430000)	\$25.35	\$18.21	\$38.85	<a href="http://www.bls.gov/oes/current/naics4_221100.htm#43-0000">http://www.bls.gov/oes/current/naics4_221100.htm#43-0000</a>
	First-Line Supervisors of Office and Administrative Support Workers (431011)	\$37.12	\$28.45	\$54.93	<a href="http://www.bls.gov/oes/current/oes431011.htm">http://www.bls.gov/oes/current/oes431011.htm</a>
	Office Clerks General (439061)	\$21.40	\$15.29	\$31.85	<a href="http://www.bls.gov/oes/current/oes439061.htm">http://www.bls.gov/oes/current/oes439061.htm</a>
	<b>Average</b>	<b>\$27.96</b>	<b>\$20.65</b>	<b>\$41.88</b>	
Licensing Staff	Paralegals and Legal Assistants (232011)	\$33.00	\$26.86	\$46.75	<a href="http://www.bls.gov/oes/current/oes232011.htm">http://www.bls.gov/oes/current/oes232011.htm</a>

---

Position Title	Occupation (SOC Code)	Hourly Mean Wage (2017 dollars)	Hourly 10th Percentile Wage (2017 dollars)	Hourly 90th Percentile Wage (2017 dollars)	Source
	Lawyers (231011)	\$81.86	\$56.92	\$106.42	<a href="http://www.bls.gov/oes/current/oes231011.htm">http://www.bls.gov/oes/current/oes231011.htm</a>
	<b>Average</b>	<b>\$57.43</b>	<b>\$41.89</b>	<b>\$76.58</b>	
Total	<b>Average</b>	<b>\$55.26</b>	<b>\$40.26</b>	<b>\$75.12</b>	
	<b>Burdened labor rate</b>	<b>\$132.63</b>	<b>\$96.63</b>	<b>\$180.28</b>	
	<b>Burdened labor rate (2018 Dollars)</b>	<b>\$135.68</b>	<b>\$98.85</b>	<b>\$184.42</b>	

- (1) For this analysis, the NRC estimated that the 90th percentile is approximately 30 percent greater than the mean.
- (2) The North American Industry Classification System (NAICS) uses a production-oriented conceptual framework to group establishments into industries based on the activity in which they are primarily engaged. Further details about the NAICS framework is provided on the BLS web pages (Ref. 48).
- (3) The Standard Occupational Classification (SOC) system is used by Federal agencies to classify workers into occupational categories. Further details about the SOC system is provided on the BLS web pages (Ref. 49).
- (4) Data was extracted using a custom query function accessible at <https://www.bls.gov/oes/>. The query selected used multiple occupations for one industry. The industry sector selected was Sector 22, utilities and the industry was Industry 221100 - Electric Power Generation, Transmission and Distribution.

## APPENDIX B: UNCERTAINTY ANALYSIS VARIABLES

Values of low, most likely and high were derived from similar historical cost data and expert opinion of the NRC staff.

Parameter	Mean value	Distribution Type	Low	Most Likely (Base)	High
<b>2018 Hourly Rate for industry</b>	\$139.22	PERT	\$100.70	\$138.70	\$179.81
<b>2018 Hourly Rate for industry (IT Support)</b>	\$98.93	PERT	\$80.63	\$98.80	\$117.76
<b>2018 NRC Labor Rate</b>	\$148.00	PERT	\$130.00	\$131.00	\$234.00
<b>2018 Other Government Labor Rate</b>	\$78.62	PERT	\$24.50	\$79.91	\$127.57
<b>2018 General Public Labor Rate</b>	\$61.32	PERT	\$27.53	\$57.36	\$110.96
Industry Effort Comments	Mean value	Distribution Type	Low	Most Likely (Base)	High
<b>EP hours:</b>	180.2	PERT	154.5	180.2	205.9
<b>Physical security hours:</b>	91.7	PERT	78.6	91.7	104.8
<b>Cyber security hours:</b>	28.5	PERT	24.4	28.5	32.5
<b>Drug and alcohol testing hours:</b>	28.5	PERT	24.4	28.5	32.5
<b>CFH training hours:</b>	37.9	PERT	32.5	37.9	43.4
<b>Decommissioning financial assurance hours:</b>	148.6	PERT	127.4	148.6	169.8
<b>Offsite and onsite financial protection portion hours:</b>	47.4	PERT	40.6	47.4	54.2
<b>Backfit hours:</b>	98.0	PERT	84.0	98.0	112.0
<b>Environmental considerations, record retention requirements, and low-level waste transportation hours:</b>	237.1	PERT	203.2	237.1	271.0
Other Govt. Effort Comments	Mean value	Distribution Type	Low	Most Likely (Base)	High
<b>EP hours:</b>	378.3	PERT	324.2	378.3	432.3
<b>Physical security hours:</b>	57.6	PERT	49.4	57.6	65.8
<b>Cyber security hours:</b>	5.0	PERT	4.3	5.0	5.7
<b>Drug and alcohol testing hours:</b>	2.5	PERT	2.1	2.5	2.9
<b>CFH training hours:</b>	27.6	PERT	23.6	27.6	31.5
<b>Decommissioning financial assurance hours:</b>	147.8	PERT	126.7	147.8	168.9
<b>Offsite and onsite financial protection portion hours:</b>	45.1	PERT	38.6	45.1	51.5
<b>Backfit hours:</b>	37.6	PERT	32.2	37.6	42.9
<b>Environmental considerations, record retention requirements, and low-level waste transportation hours:</b>	390.8	PERT	335.0	390.8	446.6

Parameter	Mean value	Distribution Type	Low	Most Likely (Base)	High
<b>Gen Public Effort Comments</b>	<b>Mean value</b>	<b>Distribution Type</b>	<b>Low</b>	<b>Most Likely (Base)</b>	<b>High</b>
EP hours:	29.2	PERT	4.1	29.2	54.3
Physical security hours:	4.6	PERT	0.6	4.6	8.6
Cyber security hours:	1.5	PERT	0.2	1.5	2.9
Drug and alcohol testing hours:	1.5	PERT	0.2	1.5	2.9
CFH training hours:	1.5	PERT	0.2	1.5	2.9
Decommissioning financial assurance hours:	50.7	PERT	7.1	50.7	94.3
Offsite and onsite financial protection hours:	3.1	PERT	0.4	3.1	5.7
Backfit hours:	0.0	PERT	0.0	0.0	0.0
Environmental considerations, record retention requirements, and low-level waste transportation hours:	116.7	PERT	16.3	116.7	217.1
<b>Number of years remaining to implement rulemaking</b>	3	NONE			
<b>NRC rulemaking contract support</b>	\$(150,000)	NONE			
<b>NRC cost (rulemaking)</b>	\$(6,060,439)	NONE			
<b>NRC cost (rulemaking) per year</b>	\$(2,020,146)	NONE			
<b>Number of NRC hours per year spent on this rulemaking effort</b>	13312	RISK UNIFORM	8606		18018
<b>Number of NRC hours per year spent on EP portion of rulemaking</b>	2293	RISK UNIFORM	1420		3167
<b>Number of NRC hours per year spent on physical security portion of rulemaking</b>	2293	RISK UNIFORM	1420		3167
<b>Number of NRC hours per year spent on cyber security portion of rulemaking</b>	462	RISK UNIFORM	355		568
<b>Number of NRC hours per year spent on drug and alcohol testing portion of rulemaking</b>	391	RISK UNIFORM	355		426
<b>Number of NRC hours per year spent on CFH training portion of rulemaking</b>	426	RISK UNIFORM	284		568
<b>Number of NRC hours per year spent on decommissioning</b>	1775	RISK UNIFORM	1420		2130

Parameter	Mean value	Distribution Type	Low	Most Likely (Base)	High
<b>financial assurance portion of rulemaking</b>					
<b>Number of NRC hours per year spent on offsite and onsite financial protection portion of rulemaking</b>	589	RISK UNIFORM	469		710
<b>Number of NRC hours per year spent on backfit portion of rulemaking</b>	156	RISK UNIFORM	99		213
<b>Number of NRC hours per year spent on environmental considerations, record retention requirements, and low-level waste transportation portions of rulemaking</b>	1938	RISK UNIFORM	710		3167
<b>Number of NRC hours per year for others (PRMB, RES, OGC, DORL (lessons learned)) spent on this rulemaking</b>	2442	RISK UNIFORM	1710		3175
<b>Number of nuclear power plant (NPP) sites that will enter the decommissioning transition phase after the rulemaking becomes effective</b>	58	NONE			
<b>Number of years from start of decommissioning, to transfer all spent fuel to dry cask storage in ISFSI</b>	10	INTEGER UNIFORM	5	10	16
<b>Number of years from start of decommissioning, when all SF is transferred to DOE</b>	26	INTEGER UNIFORM	21	26	32
<b>Number of years from start of decommissioning to site dismantlement (SAFSTOR/ENTOMB method)</b>	50	INTEGER UNIFORM	40	50	60
<b>Number of years for site to decommission (DECON method)</b>	12	INTEGER UNIFORM	8	12	16
<b>Number of years for site to decommission (DECON or SAFSTOR/ENTOMB method)</b>	34	INTEGER UNIFORM	8	34	60
<b>Number of years for spent fuel management</b>	21	INTEGER UNIFORM	4	27	33
<b>IT staff personnel required to implement cyber security protection</b>	3.3	INTEGER UNIFORM	3	3	4
<b>Cost Impact to develop site specific cost estimate for DTF</b>	\$(333,333)	PERT	\$(300,000)	\$(300,000)	\$(500,000)
<b>Hours industry to process exemption (EP)</b>	1428.6	PERT	1246.8	1419.7	1646.2

Parameter	Mean value	Distribution Type	Low	Most Likely (Base)	High
Hours NRC to process exemption (EP)	714.3	PERT	623.4	709.8	823.1
Hours industry to process amendment (EP)	1043.6	PERT	632.2	1039.0	1473.6
Hours NRC to process amendment (EP)	521.8	PERT	316.1	519.5	736.8
Hours industry to process exemption (suspension of security)	20.0	PERT	18.2	20.0	21.8
Hours NRC to process exemption (suspension of security)	10.0	PERT	9.1	10.0	10.9
Hours industry to process exemption (core damage)	20.0	PERT	18.2	20.0	21.8
Hours NRC to process exemption (core damage)	10.0	PERT	9.1	10.0	10.9
Hours industry to process exemption (communications with control room)	40.0	PERT	36.4	40.0	43.6
Hours NRC to process exemption (communications with control room)	16.0	PERT	14.6	16.0	17.4
Hours industry to process amendment (reduction of control room)	100.0	PERT	93.0	100	107.0
Hours NRC to process amendment (reduction of control room)	40.0	PERT	37.2	40	42.8
Hours industry to process amendment (applying Part 72 to ISFSI)	300.0	PERT	279.0	300	321.0
Hours NRC to process amendment (applying Part 72 to ISFSI)	150.0	PERT	139.5	150	160.5
Hours industry to process amendment (cyber security)	70.5	PERT	24.0	68.3	126.0
Hours NRC to process amendment (cyber security)	34.7	PERT	12.0	33.3	63.0
Number of hours for NRC to update a regulatory guide	866.7	PERT	600	700	1800
Hours for industry to respond to RAI CFH training program	82.3	PERT	45.0	79.7	130.0

Parameter	Mean value	Distribution Type	Low	Most Likely (Base)	High
Hours NRC to approve CFH training program	164.6	PERT	90.0	159.4	260.0
Hours industry to process exemption (DTF)	260.6	PERT	107.0	243.7	482.2
Hours NRC to process exemption (DTF)	130.3	PERT	53.5	121.8	241.1
Hours for industry to update site specific cost estimate	7.0	PERT	4.0	7.0	10.0
Hours for NRC to review update to site specific cost estimate	7.0	PERT	4.0	7.0	10.0
Hours for industry to report decommissioning funding assurance per report	6.7	PERT	4.0	7.0	8.0
Hours for NRC to review single report on decommissioning funding assurance	6.7	PERT	4.0	7.0	8.0
Hours for industry to respond to RAIs for the approval of ISFSI reports under 72.30 ( c )	14.4	PERT	0.0	14.4	28.8
Hours for NRC to approve ISFSI reports under 72.30 ( c )	8.2	PERT	0.0	8.2	16.4
Hours industry to process exemption (Insurance)	200.7	PERT	171.8	199.4	234.6
Hours NRC to process exemption (Insurance)	100.3	PERT	85.9	99.7	117.3
Hours for industry to submit cover letter in compliance with 50.54 (w)(7)	0.8	PERT	0.5	0.8	1.0
Hours for industry to complete site specific analysis for the adiabatic heatup of fuel assembly	14.5	PERT	8.7	13.9	22.3
Hours for NRC to review site specific analysis for the adiabatic heatup of fuel assembly	7.2	PERT	4.4	7.0	11.1
Hours for industry to update PSDAR	160.0	PERT	80.0	160.0	240.0
Hours for NRC to review update of the PSDAR	80.0	PERT	40.0	80.0	120.0
Hours for industry to complete full environmental analysis for decommissioning	1500.0	PERT	1000.0	1500.0	2000.0



Parameter	Mean value	Distribution Type	Low	Most Likely (Base)	High
Hours for NRC to complete NEPA analysis	1500.0	PERT	1000.0	1500.0	2000.0
Hours for industry to prepare and submit PSDAR amendment	4000.0	PERT	3000.0	4000.0	5000.0
Hours for NRC to review PSDAR amendment	2000.0	PERT	1500.0	2000.0	2500.0
Hours for industry to summarize the spent fuel management and put this summary in the PSDAR	1.1	PERT	0.8	1.1	1.5
Hours industry to process exemption (Records)	94.5	PERT	38.7	91.6	162.0
Hours NRC to process exemption (Records)	47.2	PERT	19.4	45.8	81.0
Hours industry to process exemption (Transportation)	77.5	PERT	35.0	77.5	120.0
Hours NRC to process exemption (Transportation)	38.8	PERT	17.5	38.8	60.0
Hours industry to process exemption (FOCD)	71.1	PERT	22.0	67.6	134.0
Hours NRC to process exemption (FOCD)	35.5	PERT	11.0	33.8	67.0
Averted time for teleconference calls (environmental considerations, record retention requirements, and low-level waste transportation areas) in hours	0.3	PERT	0.1	0.3	0.5
Number of teleconference calls per licensee per month for status updates and to resolve issues (environmental considerations, record retention requirements, and low-level waste transportation areas)	1.0	DUNIFORM	1.0		3.0

Parameter	Mean value	Distribution Type	Low	Most Likely (Base)	High
Number of industry people in the teleconference calls (environmental considerations, record retention requirements, and low-level waste transportation areas)	8.0	DUNIFORM	6.0		10.0
Number of NRC people in the teleconference calls (environmental considerations, record retention requirements, and low-level waste transportation areas)	4.0	DUNIFORM	2.0		6.0
Number of months for the teleconference calls	3.0	DUNIFORM	2.0		4.0
<b>FEMA fees averted</b>	\$1,036,815	PERT	\$514,005	\$946,665	\$1,917,863
<b>Average cost of business travel per week:</b>	\$950	PERT	\$600	\$950	\$1,300
<b>Industry one-time cost (pre-access drug &amp; alcohol testing) per NPP</b>	\$(168,628)	PERT	\$(202,353)	\$(168,628)	\$(134,902)
<b>Industry annual cost (manage drug &amp; alcohol testing) per NPP</b>	\$(345,479)	PERT	\$(414,575)	\$(345,479)	\$(276,383)
<b>NRC annual cost (administration drug &amp; alcohol Testing) per NPP</b>	\$(6,556)	PERT	\$(7,867)	\$(6,556)	\$(5,245)
<b>Time (in years) for NPP site to submit exemptions/amendments with respect to shutdown date</b>	0	DISCRETE UNIFORM	-1	0	1
<b>Time (in years) for NRC to finalize exemptions/amendments with respect to shutdown date</b>	1	DISCRETE UNIFORM	1	2	

**ADAMS Accession Numbers: PKG: ML18012A019; Draft Regulatory Analysis: ML18012A024. \* via e-mail**

OFFICE	NMSS/DRM/RASB/CA	NMSS/DRM/RRPB/RS	NMSS/DRM/RASB/TL	NMSS/DRM/RASB/BC
NAME	CHowells	GLappert	FSchofer	CBladey
DATE	1/20/2018	1/22/2018	2/1/2018	2/6/2018
OFFICE	NMSS/DRM/RRPB/BC	NMSS/DRM/D	RES/DE/D	NMSS/DRM/RASB/BC
NAME	MKhanna	PHolahan	BThomas	CBladey
DATE	3/2/2018	3/8/2018	2/13/2018	3/2/2018
OFFICE	OCIO/GEMSD/ISB/ICT*	RES/D*	OE/D*	NSIR/D*
NAME	DCullison	MWeber	ABoland	BMcDermott (JLubinski for)
DATE	3/2/2018	3/6/2018	3/2/2018	3/8/2018
OFFICE	NMSS/D*	NRO/D*	OGC*	NRR/D
NAME	MDapas (JTappert for)	FBrown	HBenowitz (NLO)	BHolian (MEvans for)
DATE	3/11/2018	3/8/2018	4/20/2018	4/19/2018
OFFICE	EDO			
NAME	VMcCree (MJohnson for)			
DATE	5/ 07 /2018			

**OFFICIAL RECORD COPY**