Regulatory Improvements for Power Reactors Transitioning to Decommissioning

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Regulatory Basis Document

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CONTENTS

Appendices

ACRONYMS

ACRS	Advisory Committee on Reactor Safeguards
ADAMS	Agencywide Documents Access and Management System
AEA	Atomic Energy Act
AEC	Atomic Energy Commission
AFR	away from the reactor
ALARA	as low as reasonably achievable
AMP	aging management program
ANPR	advance notice of proposed rulemaking
ASM	additional security measure
BWR	boiling-water reactor
CAS	central alarm station
CDA	critical digital asset
CEMP	comprehensive emergency management plan
CER	cumulative effects of regulation
CFH	certified fuel handler
CFR	*Code of Federal Regulations*
COL	combined license
CP	construction permit
CPG	Comprehensive Preparedness Guide
CS	critical system
CSP	cyber security program
DBA	design-basis accident
DBT	design-basis threat
DC	design certification
DCSS	dry cask storage system
DOE	U.S. Department of Energy
DP	decommissioning plan
DTF	decommissioning trust fund
EA	environmental assessment
EAB	exclusion area boundary
EAL	emergency action level
ECCS	emergency core cooling system
ECL	emergency classification level
EGM	Enforcement Guidance Memorandum
EIS	environmental impact statement
EOF	emergency operations facility
EP	emergency preparedness
EPA	U.S. Environmental Protection Agency
EPZ	emergency planning zone
ERDS	Emergency Response Data System
ERO	emergency response organization
ESA	Endangered Species Act
ESF	engineered safety feature
ETE	evacuation time estimate
FES	final environmental statement
FCF	fuel cycle facilities
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission

FFD	fitness for duty
FOCD	foreign ownership, control, or domination
FOF	force-on-force
FRN	*Federal Register* notice
FSAR	final safety analysis report
FY	fiscal year
GAO	Government Accountability Office
GDC	general design criterion/criteria
GE	General Emergency
GEIS	generic environmental impact statement
gpm	gallons per minute
GWd/MTHM	gigawatt days per metric ton of heavy metal
IAEA	International Atomic Energy Agency
ICM	interim compensatory measures
IFMP	irradiated fuel management program
IMP	insider mitigation program
IRS	Internal Revenue Service
ISFSI	independent spent fuel storage installation
ISG	interim staff guidance
LAR	license amendment request
LLW	low-level waste
LOCA	loss of coolant accident
LTP	license termination plan
MBDBE	mitigation of beyond-design-basis events
MOU	memorandum of understanding
MOX	mixed oxide
MRS	monitored retrievable storage facilities
MWt	megawatt(s) thermal
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLO	nonlicensed operator
NMSS	Office of Nuclear Material Safety and Safeguards
NOUE	Notification of Unusual Event
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OCA	owner-controlled area
OMB	Office of Management and Budget
OL	operating license
ORO	offsite response organization
OSC	Operational support center
OUO	official use only
PAA	Price-Anderson Act
PAG	protective action guide
PAR	protective action recommendation
PDEP	permanently defueled emergency plan
PRM	petition for rulemaking
PSDAR	post-shutdown decommissioning activity report
PUC	Public Utilities Commission
PWR	pressurized-water reactor
QA	quality assurance

RAI	request for additional information
RCRA	Resources Conservation and Recovery Act
RCS	reactor coolant system
REM	roentgen equivalent man
REP	radiological emergency preparedness
RG	regulatory guide
RIS	regulatory information summary
SAE	site area emergency
SAS	secondary alarm station
SAT	systems approach to training
SC	structure and component
SEC	Securities and Exchange Commission
SER	safety evaluation report
SFP	spent fuel pool
SGI	Safeguards information
SNL	Sandia National Laboratories
SOC	Statement of Considerations
SONGS	San Onofre Nuclear Generating Station
SRM	staff requirements memorandum
SSC	structure, system, and component
SSCE	site-specific decommissioning cost estimate
SSEP	security and emergency preparedness
SSNM	strategic special nuclear material
STA	shift technical advisor
TS	technical specifications
TSC	technical support center
UFSAR	updated final safety analysis report
VY	Vermont Yankee Nuclear Power Station

1 EXECUTIVE SUMMARY

The Commission directed the U.S. Nuclear Regulatory Commission (NRC) staff to proceed with an integrated rulemaking on power reactor decommissioning in a December 30, 2014, staff requirements memorandum (SRM) (Agencywide Documents Access and Management System (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, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," dated June 28, 2000 (ADAMS Accession No. ML003721626), such as the graded approach to emergency preparedness (EP), lessons learned from the plants that have already gone 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 nongovernmental stakeholders in the decommissioning process, and any other issues deemed relevant by the NRC staff.

Therefore, the NRC's goals in amending these regulations are to provide for an efficient decommissioning process; reduce the need for exemptions from existing regulations and license amendment requests; address other decommissioning issues deemed relevant by the NRC staff; and support the principles of good regulation, including openness, clarity, and reliability.

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 than at an operating power reactor. As a direct result, for the regulatory areas addressed in this rulemaking, there is not a need for the imposition of new requirements to address identified safety or security concerns. Rather, there is a need to align the requirements in decommissioning 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. Further, consistent with the Commission's direction in SRM-SECY-14-0118, the NRC staff recognized cyber security as a relevant issue that needs to be addressed. As discussed in Appendix C of this regulatory basis, "Cyber Security," rulemaking in this area would ensure 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.

The NRC staff issued an "Advance Notice of Proposed Rulemaking: Regulatory Improvements for Decommissioning Power Reactors," in the *Federal Register* (FR) on November 19, 2015 (80 FR 72358), to obtain stakeholder feedback on the regulatory issues in SRM-SECY-14-0118. The NRC received input from stakeholders in every area under consideration in the power reactor decommissioning rulemaking. The NRC received the most stakeholder input on the current regulatory approach to decommissioning, EP, and decommissioning trust funds (DTFs). The NRC staff reviewed the comments received for each regulatory area and used input received from stakeholders to develop the options presented in the draft regulatory basis, which was issued for a 90-day public comment period on March 15, 2017 (82 FR 13778). The NRC

received input from stakeholders in every area under consideration in the draft regulatory basis. The NRC received the most stakeholder input on the current regulatory approach to decommissioning, EP, and DTFs. The comments received on the draft regulatory basis were considered in the development of this document.

The NRC staff's regulatory basis concludes that there is sufficient basis to fulfill the Commission's explicit direction in SRM-SECY-14-0118 and to proceed with rulemaking to address regulatory requirements associated with power reactors transitioning to decommissioning. However, through development of its regulatory basis, the NRC staff has determined that some areas within the scope discussed in SRM-SECY-14-0118 can be addressed using other regulatory alternatives.

The NRC staff has established a sufficient regulatory basis to continue with rulemaking in the following areas:

- EP
- physical security
- cyber security
- drug and alcohol testing
- training requirements for certified fuel handlers (CFHs)
- DTFs
- offsite and onsite financial protection requirements and indemnity agreements
- application of backfitting provisions

Further, the NRC staff is recommending rulemaking to accomplish the following:

- Require that the decommissioning documents in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(bb); 10 CFR 50.82, "Termination of license"; and 10 CFR 52.110, "Termination of license," or a combination thereof, contain information on spent fuel management planning, in accordance with the regulatory requirements in 10 CFR 72.218, "Termination of licenses."

- Amend 10 CFR 51.53, "Postconstruction environmental reports," and 10 CFR 51.95, "Postconstruction environmental impact statements," to clarify the environmental reporting requirements and add a reference to 10 CFR 52.110.

- Amend 10 CFR 50.82(a) and 10 CFR 52.110 to clarify that licensees must evaluate the environmental impacts of decommissioning, and whether they are bounded, in the PSDAR.

- Amend 10 CFR 50.59(d)(3); 10 CFR 50.71(c); General Design Criterion 1, "Quality Standards and Records," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"; Criterion XVII, "Quality Assurance Records," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50; and 10 CFR 72.72(d) to remove certain record-retention requirements for structures, systems, and components (SSCs) that no longer remain in service during decommissioning, as well as duplication requirements for spent fuel storage records.

- Amend 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, for investigating shipments of low-level radioactive waste (LLW) if the shipper has not received notification of receipt within 20 days after transfer, to allow a 45-day notification window based on operating experience that shows this is a reasonable delay for LLW shipments.

The NRC staff’s regulatory basis concludes that alternatives other than rulemaking, such as the development of regulatory guidance, can be pursued to address the following regulatory areas:

- minimum staffing for non-licensed operators, including CFHs
- the appropriate role of State and local governments in the decommissioning process
- the level of NRC review of the PSDAR
- revision of the 60-year limit for power reactor decommissioning
- aging management

The NRC staff’s regulatory basis recommends that the NRC maintain the status quo for fatigue management and not extend the requirements in 10 CFR Part 26, Subpart I, to decommissioning licensees.

As discussed in this regulatory basis, the NRC’s assessment of insights from the recent licensing actions associated with decommissioning power reactors leads the NRC to conclude that changes to existing requirements are necessary for efficiency, clarity, and openness during the decommissioning process. The Commission has not approved any specific elements of the power reactor decommissioning rulemaking framework at this time, and as such, any conclusions regarding the elements of the power reactor decommissioning rulemaking are subject to change.

2 INTRODUCTION

This section discusses the evolution of the current regulatory framework and recent experience with power reactor decommissioning.

2.1 Evolution of the Current Regulatory Framework for Power Reactors Transitioning to Decommissioning

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," 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. As discussed above, the NRC staff's regulatory basis concludes that there is sufficient basis to fulfill the Commission's explicit direction in SRM-SECY-14-0118 and to proceed with rulemaking to address regulatory requirements associated with power reactors transitioning to decommissioning. Appendices A through K to this document describe in detail the current regulatory requirements and modifications that the staff is considering for each of these areas. Appendix I to this document discusses the application of backfitting provisions to decommissioning power reactors.

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 and High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste."

Decommissioning was defined 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 Commission's objective was that decommissioned facility sites would ultimately be available for unrestricted use for any public or private purpose. The amended rules provided a regulatory framework for more efficient and consistent licensing actions related to decommissioning.

The NRC noted in the 1988 final rule, "Although decommissioning is not an imminent health and safety problem … the number and complexity of facilities that will require decommissioning is expected to increase…. 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" (53 FR 24019). The regulations promulgated 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 nuclear reactor 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 NRC approval of the decommissioning plan, the Commission issued an order under 10 CFR 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. 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 NRC required that the licensee submit a detailed plan and environmental report to the Commission for approval. Before the decommissioning plan was 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 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 Rowe (August 5, 1992; ADAMS Legacy Accession No. 9208110135), Trojan (May 5, 1993; ADAMS Legacy Accession No. 9305170241), and Rancho Seco (March 17, 1992; ADAMS Legacy Accession No. 9203200277).

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 10 CFR 50.75, "Reporting and recordkeeping for decommissioning planning." 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 (SSCE) 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 power reactor 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 during its decommissioning stage is considerably less than that required for the facility during its operating stage. The NRC presented several reasons that support this position on pages 39278–39279 of the 1996 final rule *Federal Register* notice (FRN):

> 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), contaminated materials and effluents (air and water) must be minimized and controlled. Finally, 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. Moreover, emergency response procedures must be established and maintained to protect the public in the event of an accident.
>
> During the decommissioning stage of a nuclear power reactor, the nuclear fission reaction is stopped and the fuel (spent fuel assemblies) is permanently removed and placed in the spent fuel pool until transferred offsite for storage or disposal. 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 spent fuel pool, which contains circulating water, removes the decay heat and filters out any small radioactive contaminants escaping the spent fuel assemblies. The spent fuel pool system is relatively simple to operate and maintain compared to an operating power reactor. The remainder of the facility contains radioactive contamination and is 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. Safety concerns for a spent fuel pool are greatly reduced regarding both control of the nuclear fission process and the resultant generation of large amounts of heat, high neutron flux and related materials degradation, and the stresses imposed on the 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 promulgated 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. The 1996 final rule established requirements with regard to initial decommissioning activities, major decommissioning activities, and license termination procedures.

With regard to initial decommissioning activities, the 1996 final rule established requirements that were similar in approach to those in the 1988 decommissioning rule but included flexibility in the type of actions that licensees could undertake without NRC approval. For example, the 1996 final rule established that, once a licensee permanently ceases operation of the power reactor, it could not undertake any major decommissioning activities until it provided the public and the NRC with additional information. 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 proposed activities are bounded by existing analyses of environmental impacts, and a general SSCE for the proposed activities. The PSDAR is made available to the public for comment.

The 1996 final rule also established that, 90 days after the NRC receives the PSDAR submittal and the certifications under 10 CFR 50.82(a)(1) that operations have permanently ceased and that fuel has been permanently removed from the reactor vessel, the licensee could begin performing major decommissioning activities if the NRC does not offer an objection. After the NRC receives the PSDAR submittal, a public meeting takes place near the reactor site to discuss and solicit feedback on the PSDAR. Once the NRC dockets the 10 CFR 50.82(a)(1) certifications, the licensee is no longer authorized to operate the reactor. 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 necessity for a licensee that has permanently ceased operation 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 10 CFR 50.59, "Changes, tests and experiments").

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 10 CFR 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 Commission recognized that the 10 CFR 50.59 process used by the licensee during reactor operations encompassed routine activities that were similar to those undertaken during the decommissioning process. The Commission concluded that the licensee could use the 10 CFR 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 SSCE. The 1996 final rule permitted 3 percent of the generically prescribed decommissioning funds to be available to the licensee for planning purposes before permanent cessation of power reactor operations. 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 submission of the PSDAR. The use of any funds above those amounts required the licensee to submit a SSCE to the NRC prior to the use of those funds.

2.2 Power Reactor Decommissioning Activity since the 1996 Decommissioning Rule

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 SRM-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 that addresses the areas of EP, insurance, safeguards, staffing and training, and backfit protection 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.

Spent Fuel Pool Studies

Following 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, there are no possible design-basis events 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) of 1 roentgen equivalent man (rem) at the exclusion area boundary. The only accident that might lead to a significant radiological release 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 spent fuel pool (SFP), resulting in a significant heatup of the spent fuel, and culminating in substantial zirconium cladding oxidation 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.

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 zirconium fire propagation 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.

The NRC reassessed the risk of an SFP accident in the late 1990s to support a risk-informed rulemaking for permanently shutdown, or decommissioned, nuclear power plants in the United States. The NRC staff'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 below) 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. The NRC's regulatory actions after the terrorist attacks of September 11, 2001, have significantly enhanced the safety of SFPs. The 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 the potential 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 potential 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 initiation has decreased and is expected to be less than previously analyzed in NUREG-1738 and previous studies. Concerning SFP safety and the potential of aircraft impacts, the NRC previously addressed this issue through orders after the events of September 11, 2001, that required licensees to have 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," issued December 2006 (ADAMS Accession No. ML070090060). The NRC endorsed this guidance on December 22, 2006 (ADAMS Accession No. ML063560235 (not publicly available)). The NRC's issuance of the final rule titled "Power Reactor Security Requirements" on March 27, 2009 (74 FR 13926), made the requirements in the orders generically applicable. In that final rule, the NRC added 10 CFR 50.54(hh)(2) to require licensees to implement mitigating measures to 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 10 CFR 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. The NRC found the NEI guidance to be an effective means for mitigating the potential loss of large areas of the plant resulting from fires or explosions.

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 drained and its initial water inventory is reduced or lost entirely. The analyses conducted by the 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. 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 10 CFR 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, such as the 1x4 pattern, 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 loading patterns, 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), that 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 possible 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. 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.

As discussed above, the additional mitigation strategies implemented subsequent to the terrorist attacks of September 11, 2001, such as the promulgation of 10 CFR 50.54(hh)(2) and the NRC's review and endorsement 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.

SECY-00-0145

On June 28, 2000, the NRC staff submitted SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning" (ADAMS Accession No. ML003721626), to the Commission. 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. SECY-00-0145 addressed the regulatory areas of EP, insurance, safeguards, staffing and training, and backfit protection for decommissioning power reactors. The rulemaking plan was contingent on the completion of a zirconium fire risk study (discussed above) issued on February 28, 2001.

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. Given the security implications of the terrorist attacks of September 11, 2001, and the results of the 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.

Recent Experience with Power Reactor Decommissioning

Between 1998 and 2013, no additional power reactors permanently ceased operation. Between 2013 and 2016, 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 Generation 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. Both facilities are transitioning to decommissioning.

The following licensees have notified the NRC of their intent to permanently cease operations at other power reactors:[1]

- By letter dated January 7, 2011 (ADAMS Accession No. ML110070507), Exelon notified the NRC that it plans to permanently cease operations at Oyster Creek Nuclear Generating Station no later than December 31, 2019.

- By letter dated November 10, 2015 (ADAMS Accession No. ML15328A053), Entergy notified the NRC that it plans to permanently cease operations at Pilgrim Nuclear Power Station no later than June 1, 2019.

- By letter dated June 21, 2016, Pacific Gas and Electric Company notified the NRC that it will not pursue license renewals for Diablo Canyon Power Plant, Units 1 and 2, but will continue to operate the units until the current licenses expire in 2024 and 2025, respectively (ADAMS Accession No. ML16173A454). Both units would permanently cease operations at that time and transition to decommissioning.

- On January 4, 2017, Entergy notified the NRC that it plans to permanently cease operations at Palisades Nuclear Plant by October 1, 2018 (ADAMS Accession No. ML17004A062). Entergy later notified the NRC on September 28, 2017, that the date of shutdown had shifted to the spring of 2022 (ADAMS Accession No. ML17271A233).

- On January 9, 2017, Entergy announced that the State of New York and Entergy had entered into a closure agreement for Indian Point Nuclear Generating Plant (Indian Point), dated January 8, 2017, in which Entergy agreed to cease plant operations at Indian Point Unit 2 no later than April 30, 2020, and at Indian Point Unit 3 no later than April 30, 2021, unless both the State of New York and Entergy agree to extend plant operations for cause to no later than April 30, 2024, for Unit 2 and April 30, 2025, for Unit 3. By letter dated February 8, 2017 (ADAMS Accession No. ML17044A004), Entergy notified the NRC that it plans to permanently cease operations at Indian Point Units 2 and 3 no later than April 30, 2020, and April 30, 2021, respectively.

- By letter dated June 20, 2017 (ADAMS Accession No. ML17171A151), Exelon notified the NRC that it plans to permanently cease operations at Three Mile Island, Unit 1, on or about September 30, 2019.

[1] James A. Fitzpatrick Nuclear Power Plant (FitzPatrick), Clinton Power Station (Clinton), and Quad Cities Nuclear Power Station had announced intentions to permanently cease operations at these facilities; however, by letters dated December 14, 2016, and January 4, 2017 (ADAMS Accession Nos. ML16349A311, ML16349A314, and ML17012A280), these decisions have been reversed.

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 approval of exemptions and license amendments to revise requirements to reflect the reduced operations and risks posed by a permanently shutdown and defueled reactor.

December 2014 Commission Direction

In SRM-SECY-14-0118, the Commission directed the NRC staff 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 gone 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 (DECON, SAFSTOR, and ENTOMB) for decommissioning and the timeframes associated with those options
- the appropriate role of State and local governments and nongovernmental 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," 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. In SECY-15-0127, "Schedule, Resource Estimates, and Impacts for the Power Reactor Decommissioning Rulemaking," dated October 7, 2015 (not publicly available), the NRC staff provided further information to the Commission on resource estimates and work that would be delayed or deferred in fiscal year 2016 to enable the NRC staff to make timely progress consistent with the Commission's direction. In SECY-15-0127, the NRC staff stated that it would "maintain its focus on the current decommissioning transition licensing actions, while proceeding with a schedule to finalize the power reactor decommissioning rule in CY 2019."

Advance Notice of Proposed Rulemaking

To gather information for the power reactor decommissioning rulemaking, the NRC published an ANPR in the *Federal Register* on November 19, 2015 (80 FR 72358). The ANPR began the process for considering amendments to the NRC's regulations that address regulatory improvements for power reactors transitioning to decommissioning. The ANPR sought public comment on specific questions and issues with respect to possible revisions of the NRC's requirements. The NRC staff considered the ANPR comments in its formulation of the draft regulatory basis. Section 5 of the draft regulatory basis (ADAMS Accession No. ML17047A413) summarizes the public comments received on the ANPR.

Decommissioning Lessons Learned Report

The NRC staff published the "Power Reactor Transition from Operations to Decommissioning: Lessons Learned Report" in October 2016 (ADAMS Accession No. ML16085A029). The report documents the lessons learned by the NRC staff and stakeholders associated with recent 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 Power Station, Crystal River Unit 3 Nuclear Generating Plant, SONGS Units 2 and 3, and VY. The NRC staff reviewed and approved certain requests for exemption from NRC's regulations and license amendment requests for these plants to modify the operating reactors' licensing bases to reflect those of decommissioning reactors. The NRC staff then transferred the project management and oversight responsibility from the Office of Nuclear Reactor Regulation to the Office of Nuclear Material Safety and Safeguards (NMSS). NMSS provides project management support for these decommissioning reactors until termination of the respective licenses. 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 staff during the decommissioning transition licensing reviews from 2013 to 2016 and the NRC staff's actions to address those challenges. The report also discusses external stakeholders' interest in the NRC staff'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 discussed above, the report provides detailed project management guidance, lessons learned, 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 staff has considered many of the lessons learned and recommendations described in this report during development of the regulatory basis for the power reactor decommissioning rulemaking.

Draft Regulatory Basis

To gather more information for the power reactor decommissioning rulemaking, the NRC published a draft regulatory basis in the *Federal Register* on March 15, 2017 (82 FR 13778). In the draft regulatory basis, the NRC staff considered amendments to the NRC's regulations that address regulatory improvements for power reactors transitioning to decommissioning. The subjects contained in the draft regulatory basis are the same as those discussed in Appendices A through K of this document. The draft regulatory basis sought public comment on

specific questions and issues with respect to possible revisions of the NRC's requirements. The NRC staff considered the draft regulatory basis comments in its formulation of this regulatory basis. Section 5 of this document summarizes the public comments received on the draft regulatory basis.

2.3 Summary of Recent Licensing Experience with Decommissioning Power Reactors

The NRC staff has processed a significant number of licensing actions, including exemptions, license amendments, and other actions (e.g., order withdrawals), for licensees that have recently transitioned or are currently transitioning from operation to decommissioning.

Current Regulatory Process for Power Reactor Decommissioning Transition

Reactor decommissioning requirements are codified in 10 CFR 50.82 and 10 CFR 52.110. Associated decommissioning funding requirements are codified in 10 CFR 50.75. 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 10 CFR 50.82(a)(1) or 52.110(a). Once the NRC dockets 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.[2]

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 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 need 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.

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 risk to public health and safety. As explained in Section 2.1 and 2.2 of 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 will request certain amendments to their licenses and certain exemptions from the NRC's regulations for operating plants. These

2 In this document, discussion of licensee requirements under 10 CFR 50.82 also includes equivalent requirements in 10 CFR 52.110.

licensing actions, which are processed by the NRC during the transition from operating to decommissioning, establish the regulatory framework for reactors that have permanently shut down and defueled.

In addition to requesting license amendments and exemptions, licensees can make certain changes without prior NRC approval if the changes are permitted by an NRC regulation. Licensees primarily use a screening process with criteria in 10 CFR 50.59 to make changes in a facility (or procedures) as described in the final safety analysis report (as updated), including changes to the PSDAR, without prior NRC approval. The licensee's updated final safety analysis report should reflect changes to the decommissioning design-basis analyses, SSCs, and the licensee's organizations, processes, and procedures. Licensees also use the provisions of 10 CFR 50.12, "Specific Exemptions"; 10 CFR 50.90, "Application for Amendment of License, Construction Permit, or Early Site Permit"; 10 CFR 73.5, "Specific Exemptions"; 10 CFR 50.54(p); and 10 CFR 50.54(q) (among others) to obtain NRC approval for changes to the facility licensing bases.

The timing and implementation for some decommissioning licensing actions rely on an approach that recognizes the reduction in 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 does 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 must also assess a postulated, very low probability, beyond-design-basis zirconium fire scenario.

Decommissioning Planning

The NRC designed the current 10 CFR Part 50 regulations for reactor decommissioning for plants that were expected to be permanently shut down at the end of their operating license terms. The decommissioning planning process is expected to start 5 years before the end of the license term. Regardless of when the plant permanently shuts down, the licensee must submit the certification of permanent cessation of operations and the certification of permanent fuel removal to the NRC along with its PSDAR as the key means of communicating to the NRC and the public the licensee's plans for decommissioning the reactor. The following information provides a high-level summary of the anticipated licensing actions processed during reactor decommissioning transition. The appendices to this regulatory basis provide more detailed information on these topical areas.

Post-shutdown Decommissioning Activities Report

Under 10 CFR 50.82(a)(4)(i), the NRC requires the licensee, prior to or within 2 years after permanent cessation of operations, to submit a PSDAR to the NRC and to send a copy to the affected State(s). Regulatory Guide (RG) 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report," issued June 2013 (ADAMS Accession No. ML13140A038), addresses the contents of the PSDAR. The PSDAR must contain a description of the planned decommissioning activities, a schedule for the completion of these activities, an estimate of expected costs of these activities, and a discussion of the reasons for concluding that the environmental impacts associated with the site-specific decommissioning activities will be bounded by the previously issued environmental impact statements.

In accordance with 10 CFR 50.82, the NRC is required to notice the PSDAR in the *Federal Register* and make it available for public comment. In addition, the NRC staff is required to hold a public meeting in the vicinity of the site. There is a 90-day waiting period from the date that a licensee submits both its certifications under 10 CFR 50.82(a)(1) and PSDAR until the date when the licensee can perform any "major decommissioning activities," as defined in 10 CFR 50.2, "Definitions," or have full access to the funds within the DTF. Although the current regulations do not require the NRC to approve the licensee's PSDAR, the NRC does review the PSDAR's content against the requirements in 10 CFR 50.82(a)(4)(i) and the guidance and acceptance criteria in RG 1.202, "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," issued February 2005 (ADAMS Accession No. ML050230008), and NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors," issued December 2004 (ADAMS Accession No. ML043510113). The NRC staff also issues a PSDAR closeout letter that addresses, at a high level, any stakeholder comments received. The closeout letter is issued as soon as practical following the completion of the NRC staff's review of the PSDAR.

Irradiated Fuel Management Program

Another item related to decommissioning planning is the licensee's submittal of an irradiated fuel management program (IFMP) for preliminary staff approval, as required in 10 CFR 50.54(bb). Specifically, 10 CFR 50.54(bb) requires licensees to submit an IFMP to the NRC for preliminary approval within 2 years following permanent cessation of operations of the reactor or 5 years before expiration of the reactor operating license, whichever occurs first. Licensees have satisfied this requirement by submitting the IFMP together with the preliminary SSCE.

The purpose of the IFMP is to provide reasonable assurance that the licensee has a program or strategy to manage and provide funding for the management of irradiated fuel during decommissioning in a manner that is consistent with NRC requirements and that it will be implemented in a timely manner. Although a decommissioning licensee may have previously submitted the IFMP and received preliminary approval 5 years before permanent shutdown (or during license renewal), the licensee will have to update the program upon permanent shutdown in accordance with 10 CFR 50.82(a)(8)(vii). The licensee must include the updated IFMP as part of the information needed to support the PSDAR per 10 CFR 50.82(a)(4)(i). The licensee may also use the IFMP to support an exemption request to permit use of the DTF for irradiated fuel management expenses.

Site-Specific Decommissioning Cost Estimate

Another submission required 5 years prior to the end of projected operation is a "preliminary" SSCE pursuant to 10 CFR 50.75(f)(3). The purpose of the preliminary SSCE is to provide the NRC with an up-to-date estimate of decommissioning costs and to identify major factors that may impact the cost to decommission a facility. In addition, the comparison of this estimate against the minimum DTF amount required in 10 CFR 50.75(b) and (c) provides reasonable assurance that the licensee's decommissioning trust will have sufficient funding to decommission the facility. Guidance in RG 1.202 provides the standard format and content of SSCEs for nuclear power reactors.

Financial Exemptions

Decommissioning Trust Fund Exemption Requests

The regulations in 10 CFR 50.2, 10 CFR 50.75, and 10 CFR 50.82 restrict the use of the DTF to expenses for legitimate decommissioning activities (i.e., removal of a facility or site safely from service and reduction of residual radioactivity to a level that permits restricted or unrestricted release of the property and license termination). A DTF cannot be used for other purposes, such as for irradiated fuel management (commonly referred to as spent fuel management) costs or costs to restore the site to a green field condition. In those cases in which the DTF is projected to have more than enough money to complete legitimate decommissioning activities, licensees have requested exemptions to use the excess funds for spent fuel management and, in some cases, site restoration activities. The requested exemptions usually also ask that such withdrawals from the trust be allowed to be made without prior notification to the NRC.

The NRC staff reviews the licensee's DTF, the decommissioning approach and costs in the PSDAR and SSCE, and the updated IFMP to determine whether the licensee has provided reasonable assurance that adequate funds will be available in the trust to complete decommissioning and license termination. In previously granted exemptions, the NRC has concluded that allowing the licensee to use a portion of the DTF for spent fuel management would not prevent the licensee from completing radiological decontamination and cleanup of the decommissioning reactor site through license termination.

Some licensees have also requested and been granted exemptions to use DTFs for spent fuel management to support the accelerated transfer of spent fuel from the SFP to dry cask storage.

Granting of an Exemption from Offsite Liability Insurance Requirements

Based on recent experience, the NRC expects that most permanently shutdown reactor licensees will request exemptions from certain requirements in 10 CFR 140.11(a)(4) during the decommissioning transition period. The exemption reduces the required amount of primary offsite liability insurance coverage from $450 million to $100 million, and allows the licensee to withdraw from the secondary layer of financial protection. Consistent with Commission precedent, this exemption is informed by analyses that demonstrate that the zirconium fire risk is very small once the spent fuel has reached a sufficiently low decay heat level.

Granting of an Exemption from Onsite Property Damage and Cleanup Insurance Requirements

Most licensees for permanently shutdown reactors will request exemptions from certain requirements in 10 CFR 50.54(w)(1) to reduce the required level of onsite property damage insurance from $1.06 billion to $50 million. Consistent with Commission precedent, this exemption is informed by analyses that demonstrate that the zirconium fire risk is very small once the spent fuel has reached a sufficiently low decay heat level.

Staffing Considerations

Approval of Certified Fuel Handler Training Program

Pursuant to 10 CFR 50.54(m), each licensee must have at its site one or more persons who hold senior operator licenses for all fueled units at the site. When a power reactor licensee permanently ceases operations and defuels the reactor and is no longer authorized to load fuel into the reactor vessel under 10 CFR 50.82(a)(2), the reactor is in a configuration in which the reactivity or power level of the reactor is no longer meaningful and there are no conditions under which the manipulation of apparatus or mechanisms can affect the reactivity or power level of the reactor. Therefore, 10 CFR 50.54(m) and 10 CFR Part 55, "Operators' Licenses," do not require licensed operators at decommissioning reactors.

In lieu of licensed operators, a CFH is the senior onshift operations representative on site at a decommissioning reactor. The CFH is a nonlicensed operator position that was established as part of the 1996 rulemaking for power reactors that have permanently shut down and transitioned to decommissioning. The CFH will be the onshift management representative responsible for supervising and directing the monitoring, storage, handling, and cooling of irradiated nuclear fuel and responding to facility emergencies in a manner consistent with ensuring adequate protection of public health and safety. As specified in 10 CFR 50.2, a CFH for a nuclear power reactor facility means a nonlicensed operator who has qualified in accordance with a fuel-handler training program approved by the Commission. The NRC staff reviews the training program to verify that it contains the necessary training elements to qualify the CFH with the requisite knowledge and experience to protect public health and safety, provide appropriate oversight of decommissioning activities, and respond to plant emergencies.

Besides approval of the fuel-handler training program, implementation of the CFH staffing position for decommissioning reactors typically requires an amendment to the staffing requirements in the Administrative Controls section of the licensee's technical specifications (TS).

Changes to the License

Defueled Technical Specifications—Comprehensive Amendment to All Technical Specifications

All licensees of recently permanently shutdown reactors have proposed comprehensive amendments to their facilities' TS to reflect their permanently shutdown and defueled status. Power reactor licensee TS specify modes of applicability that correspond to conditions of operation for the reactor or apply only when fuel is in the reactor vessel. For a permanently shutdown and defueled reactor, these modes refer to conditions that are no longer possible because the reactor cannot be operated and fuel cannot be placed in the reactor vessel. In such cases, TS with modes of applicability can be removed from the license without affecting the safety of the facility. In addition, substantial changes can also be made to the Administrative

Controls section of the TS, including changes to facility staff responsibilities, staffing organization, and staffing levels. Some program and reporting requirements that only apply to operating reactors are also deleted or modified.

In addition to decommissioning-related amendments to the operating reactor TS described above, the licensee may request two TS license amendments that are narrow in scope early in the decommissioning transition process. One involves the use of the CFH, as discussed above. Another amendment may be needed to support irradiated fuel handling.

License Conditions

All 10 CFR Part 50 reactor licenses contain license conditions that the NRC has imposed on licensees when appropriate and necessary in accordance with 10 CFR 50.50, "Issuance of Licenses and Construction Permits." When the reactor is permanently shut down and defueled, many of the license conditions are no longer relevant and can be modified or removed from the license.

In most circumstances, the fire protection program license condition can be removed because it is intended to ensure that protections are in place to reach safe shutdown in the event of a fire. The requirements for decommissioning reactors specified in 10 CFR 50.48, "Fire protection," require the licensee to maintain fire protection capabilities for the rest of the plant to address fire events that may have radiological consequences. Therefore, removal of the operating reactor fire protection license condition should not impact fire protection at a decommissioning reactor.

Currently, the MBDBE draft final rule is with the Commission for approval. If the Commission approves the MBDBE rule, the rule would enable the license conditions associated with mitigating strategies for large fires and explosions to be administratively removed, and instead licensees would continue to comply with the same requirements which are in the MBDBE draft final rule text at 10 CFR 50.155(b)(3). These requirements for mitigating strategies would remain in effect until all fuel is removed from the SFP. It should be noted that the NRC staff's evaluation of the exemptions related to EP regulations relies heavily on the licensee's implementation of the mitigating strategies license condition for the SFP.

For reactors that have received renewed operating licenses, some license conditions may need to be modified or removed depending on site-specific conditions.

Emergency Preparedness

During the decommissioning transition period, licensees typically request several EP licensing actions to address the reduced risk associated with a permanently shutdown and defueled facility. These actions include an initial post-shutdown amendment to the emergency plan modifying the licensee's onshift and emergency response organization (ERO) staffing under the existing regulatory requirements in 10 CFR Part 50, an exemption from many of the EP regulations, and an amendment approving a permanently defueled emergency plan (PDEP) and emergency action level scheme implementing the EP regulatory exemptions. Subsequently, the licensee may also submit a license amendment reflecting a further reduction in ERO staffing under the EP requirements, as exempted, to reflect the transfer of spent fuel from the SFP to an independent spent fuel storage installation (ISFSI).

Changes in the Onshift and Emergency Response Organization Staffing upon Permanent Shutdown and Defueling

Early in the decommissioning transition period, licensees may request an amendment to their emergency plans to remove certain onshift and augmented ERO positions based on the permanently shutdown and defueled condition of the facility. Once the facility is in this condition, certain staff (e.g., core or thermal-hydraulic engineers) are no longer needed to respond to an event at an operating facility. These onshift and augmented ERO positions would no longer be necessary after the licensee has: (1) certified under 10 CFR 50.82(a)(1) that the reactor has permanently ceased operation and fuel has permanently been removed from the reactor vessel and (2) determined that credible accidents no longer exist that would require these functions. However, adequate onshift and augmented ERO staffing must be maintained to support the prompt implementation of the emergency plan and the timely and effective communication and coordination with offsite response organizations.

Emergency Preparedness Exemptions and Permanently Defueled Emergency Plan and Emergency Action Level Scheme Amendment

The standards for offsite REP plans in 10 CFR 50.47, "Emergency plans," continue to apply after the licensee permanently ceases reactor operations. However, the NRC has taken the position in numerous exemptions that after some period of time (normally 15 to 18 months), such formal offsite REP plans are unnecessary. The period of time depends on the decay of spent fuel stored in the SFP and site-specific considerations necessary to meet the EP exemption criteria. These criteria include: (1) a postulated radiological release would not exceed the EPA PAGs at the exclusion area boundary for DBAs that apply to a permanently shutdown and defueled reactor and (2) sufficient time would exist for operators to take prompt mitigative actions in response to a postulated zirconium fire accident scenario in the SFP and, if warranted, for officials to take appropriate response actions to protect public health and safety using a comprehensive emergency management plan (CEMP).[3] Once the EP exemption is granted, the NRC no longer requires a formal determination by the Federal Emergency Management Agency (FEMA) of the adequacy of offsite REP plans.

Permanently shutdown and defueled power reactor licensees typically request regulatory exemptions from certain standards in 10 CFR 50.47 and requirements in Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50. Decommissioning licensees submit site-specific analyses supporting requested exemptions from emergency plan regulations based on the criteria listed above. The licensees have also submitted a corresponding license amendment request to revise their emergency plans to implement the exemptions listed above as part of a PDEP. In conjunction with or as part of the PDEP amendment, licensees also submit changes to emergency action level schemes.

[3] A CEMP in this context, also referred to as an emergency operations plan, is addressed in the Federal Emergency Management Agency's (FEMA's) Comprehensive Preparedness Guide (CPG) 101, "Developing and Maintaining Emergency Operations Plans." CPG 101 is the foundation for State, territorial, Tribal, and local EP in the United States. It promotes a common understanding of the fundamentals of risk-informed planning and decisionmaking and helps planners at all levels of government in their efforts to develop and maintain viable emergency plans for all hazards and all threats. An emergency operations plan is flexible enough for use in all emergencies. It describes how people and property will be protected; details who is responsible for carrying out specific actions; identifies the personnel, equipment, facilities, supplies, and other resources available; and outlines how all actions will be coordinated. A CEMP is often referred to as a synonym for "all hazards planning."

Once implemented, the PDEP would no longer require, under 10 CFR 50.47, State and local authorities to maintain formal FEMA-approved offsite REP plans, including the 10-mile plume exposure pathway and 50-mile ingestion pathway emergency planning zones (EPZs). Licensees would continue to maintain an onsite emergency plan and response capabilities, including the notification of local government officials of an emergency declaration. If needed, offsite authorities may implement protective measures for the public using a CEMP (all-hazards) approach. Licensees also continue to notify the NRC and designated offsite agencies following the declaration of an emergency classification and maintain communications and interface responsibilities with offsite response organizations that may be called upon to provide assistance on site in the event of an emergency declaration. Provisions for fire, ambulance, and medical services continue to be agreed upon through letters of agreement between licensees and local entities.

When processing an EP exemption request, the NRC staff must obtain Commission approval, based on Commission's direction in SRM-SECY-08-0024, "Staff Requirements—SECY-08-0024—Delegation of Commission Authority to Staff To Approve or Deny Emergency Plan Changes that Represent a Decrease in Effectiveness," dated May 19, 2008 (ADAMS Accession No. ML081400510). Specifically, the Commission directed the staff to "request Commission approval for any reduction in the effectiveness of a licensee's emergency plan that requires an exemption from the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50."

Termination of the Emergency Response Data System

Appendix E, Section VI, to 10 CFR Part 50 requires that operating reactor licensees maintain the Emergency Response Data System (ERDS) data link to the NRC. The licensee is not required to maintain the ERDS when it has permanently ceased operation and has permanently removed fuel from the reactor vessel. Therefore, once these conditions are met, the licensee may remove the ERDS from service without prior NRC approval under 10 CFR 50.54(q). However, under 10 CFR 50.54(q)(5), the licensee is required to retain a record of each change to its emergency plan made without NRC approval for a period of 3 years.

Following notification from the licensee of its intent to terminate the ERDS data link, the NRC staff will issue a letter to the decommissioning reactor licensee acknowledging termination of the ERDS data link. In some cases, the NRC has established memoranda of understanding with States in which or near to which a facility is located, under which the NRC provides the States with access to the information that the NRC receives through the ERDS in support of offsite protective action decisionmaking. In this situation, the NRC will issue letters to the States informing them of the licensee's intent to terminate the ERDS.

Physical Security

The physical security requirements of 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage," as well as Appendix B, "General Criteria for Security Personnel," and Appendix C, "Licensee Safeguards Contingency Plans," to 10 CFR Part 73, "Physical Protection of Plants and Materials," continue to apply to a nuclear power reactor after permanent cessation of operations and removal of fuel from the reactor vessel. The NRC's regulations governing physical security requirements applicable to a nuclear power reactor do not distinguish between an operating power reactor and a power reactor that is in a decommissioning status. These security requirements are

designed to protect against the design-basis threat (DBT) of radiological sabotage as stated in 10 CFR 73.1, “Purpose and scope.”

Licensees have sought NRC approval of exemptions to reduce physical security requirements for permanently shutdown reactors because the security-risk profile presented by a decommissioning plant is much less than when it was operating. The recent physical security-related exemptions that licensees transitioning to decommissioning have requested include areas such as the authority of CFHs to suspend security measures during severe weather or emergencies, communications between the central alarm station and control room, the number of armed responders, requirements for force-on-force exercises, and a combination of the central and secondary alarm stations. The NRC has granted several of these exemptions and is reviewing others. Several of these exemptions requested by a decommissioning licensee were site-specific and may not have been generically applicable.

Many of the physical security program changes at decommissioning reactor sites can be accomplished without NRC approval under the provisions of 10 CFR 50.54(p) as long as the changes do not decrease the effectiveness of the licensee’s security plans. Experience has demonstrated that, although the physical security program changes may not require NRC approval, exemption, or a license amendment, the NRC staff expends effort in reviewing and verifying that the security plans remain effective.

Order Withdrawals

Licensees may request withdrawals of orders related to the Fukushima Dai-ichi accident, including:

- EA-12-049, “Issuance of Order to Modify Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events” (ADAMS Accession No. ML12054A735), dated March 12, 2012. The MBDBE draft final rule was sent to the Commission in December 2016, and, among other things, would make the provisions of this order generically applicable.

- EA-12-051, “Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation,” (ADAMS Accession No. ML12056A044), dated March 12, 2012. The MBDBE draft final rule was sent to the Commission in December 2016, and, among other things, would make the provisions of this order generically applicable.

- EA-13-109, “Issuance of Order To Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions,” dated June 6, 2013 (ADAMS Accession No. ML13143A321).

Currently, the MBDBE draft final rule is with the Commission for approval. If the MBDBE rule is approved by the Commission, the rule would withdraw Orders EA-12-049 and EA-12-051 as they would no longer be separately necessary.

One comment on the decommissioning rule draft regulatory basis requested clarification on whether Order EA-13-109 would also be rescinded. Order EA-13-109 is not within the regulatory scope of the MBDBE rule and would not be rescinded by the MBDBE rule. The NRC currently has no plans to rescind that order.

Licensees may also request that the NRC rescind security-related orders that are no longer applicable to those licensees.

Miscellaneous Licensing Actions

Exemption from Certain Recordkeeping Regulations

Licensees that are transitioning to decommissioning may request exemptions from certain parts of the following record retention requirements that require the retention of records until termination of the license:

- 10 CFR Part 50, Appendix A, Criterion 1,
- 10 CFR Part 50, Appendix B, Criterion XVII,
- 10 CFR 50.59(d)(3), and
- 10 CFR 50.71(c).

Licensees that have previously been granted these exemptions used the justification that, when the associated 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 on a practical basis.

In addition, several licensees have requested an exemption from the requirements of 10 CFR 72.72(d), which requires 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 the ISFSI spent fuel records will be stored 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 (QA) program.

Records associated with SSCs that maintain compliance and that protect public health and safety during the decommissioning process are excluded from exemptions from certain recordkeeping regulations. Examples include those SSCs associated with programmatic controls such as controls pertaining to residual radioactivity, security, and 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 impact the decommissioning records retention requirements of 10 CFR 50.75, or any other requirements of 10 CFR Part 50 applicable to decommissioning.

Approval of Changes to the Licensee's Quality Assurance Program

A reactor licensee transitioning to decommissioning may elect to simplify and revise its current QA program commensurate with the permanently shutdown and defueled status of the reactor, given the fewer number of SSCs for a decommissioning facility and the fewer number of quality standards that would apply. Such changes include: (1) those that do not reduce commitments in the program description as accepted by the NRC and (2) those that do reduce commitments and require NRC approval.

Changes to the QA program that do not reduce commitments must be submitted to the NRC but do not require prior approval. Such changes include administrative improvements and

clarifications; spelling, punctuation, or editorial corrections; the use of an NRC-approved QA standard that is more recent than the QA standard in the licensee's current QA program; the use of a QA alternative or exception approved by a previous NRC safety evaluation; and others. The regulation at 10 CFR 50.54(a)(3) describes all such changes.

Changes that do reduce commitments in the program description as accepted by the NRC must be submitted to the NRC and receive approval prior to implementation in accordance with 10 CFR 50.54(a)(4). Changes to the QA program description are considered accepted by the NRC upon receipt of a letter to this effect from the appropriate reviewing office or 60 days after submittal to the NRC, whichever occurs first.

Exemption from Certain Low-Level Waste Shipment Tracking Requirements

Licensees that are involved in the decommissioning process may request exemptions from certain parts of the requirements in 10 CFR Part 20, Appendix G, Section III.E, regarding investigating rail shipments of LLW if the shipper has not received notification of receipt within 20 days after transfer. Licensees that have previously been granted these exemptions typically requested extension ofthe investigation notification window to 45 days using the justification that operational experience indicates that rail shipments may take more than 20 days to reach their destination due to delays in route that are outside the licensees control (e.g., rail cars waiting in switchyards to be included in a train to the disposal facility).

By extending the elapsed time for receipt acknowledgment to 45 days before requiring investigations, tracing, and reporting, a reasonable upper limit on shipment duration (based on historical analysis) is provided.

Summary of Current Licensing Approach

Overall, the NRC staff's experience confirms that the current exemption and amendment processes for transitioning plants are sufficient to provide reasonable assurance of adequate protection of public health and safety and are consistent with the common defense and security. Most of the licensee exemption and amendment requests do not involve safety or security issues. Instead, such requests are based on efficiencies gained and the associated reduction of staff and licensee resources required for a plant that is undergoing decommissioning, consistent with the reduction in radiological risk compared to operating reactors. As discussed above, the NRC staff completed and published a lessons learned report in October 2016. Table 3-3, "Key Licensing Action Evaluations for Future Reference," of that report summarizes the current regulatory requirements, licensing actions, and recent regulatory activity.

3 TECHNICAL BASIS FOR A POWER REACTOR DECOMMISSIONING RULEMAKING

Consistent with the power reactors that permanently shut down in the 1990s, licensees that are currently transitioning to decommissioning are requesting NRC review and approval of licensing actions, which has established a regulatory framework based on: (1) the lower risk of an offsite radiological release posed by a decommissioning reactor as compared to an operating reactor, (2) the operational realities (e.g., staffing changes and knowledge management challenges) of a plant that is no longer operating and will be dismantled and decontaminated, and (3) the guidelines established by the current decommissioning regulations contained in 10 CFR 50.82 and 10 CFR 50.83, "Release of part of a power reactor facility or site for unrestricted use," which the NRC revised in 1996 to reflect lessons learned during the review process for the previous set of decommissioning facilities.

As discussed in Section 2.3 of this document, decommissioning licensees have sought and received NRC approval of exemptions and amendments to: (1) reduce regulatory requirements no longer needed or no longer relevant for permanently shutdown and defueled reactors because the hazards presented by a decommissioning plant are significantly reduced from the time when the plant was operating and (2) streamline and add efficiencies to the overall licensing basis that reflect the decommissioning status of the plant. Decommissioning reactor licensees and the NRC staff have expended substantial resources processing these licensing actions for power reactors during and after their transition period to a decommissioning status. As such, the current regulatory process is not an efficient use of NRC staff or licensee resources and introduces unnecessary regulatory burden.

Accordingly, rulemaking is necessary in several regulatory areas to clarify the process for the appropriate implementation of requirements while continuing to provide reasonable assurance of adequate protection of public health and safety for decommissioning plant licensees. Rulemaking in these areas will reduce or eliminate the need for: (1) licensees to apply for many license amendments and exemptions from the operating nuclear power plant regulations, (2) the staff to process such applications, and (3) the Commission to review and approve certain exemptions and other licensing actions.

Appendices A through K of this document describe the issues under consideration in the power reactor decommissioning rulemaking. These appendices contain the NRC staff's detailed technical basis related to EP, physical security, training requirements for CFHs, DTFs, offsite and onsite liability protection requirements and indemnity agreements, the timeframe for decommissioning, application of backfitting protection, the advisability of requiring a licensee to submit its PSDAR for NRC approval, the appropriateness of maintaining the three existing options (DECON, SAFSTOR, and ENTOMB) for decommissioning, and the appropriate role of State and local governments and nongovernmental stakeholders in the decommissioning process. In addition to those areas in which licensees have pursued licensing actions, the Commission directed the NRC staff in SRM-SECY-14-0118 to consider "any other issues deemed relevant by the staff." Specifically, Appendices C, D, J, and K contain the NRC staff's detailed technical basis related to cyber security, drug and alcohol testing, aging management, and fatigue management.

Appendices A through K also describe the options considered by the NRC staff and its recommended option in each area. The options that the NRC considered in Appendix C, "Cyber

Security," Appendix G, "Onsite and Offsite Insurance and Indemnity Agreements," and Appendix K, "Fatigue Management," rely on the timing of a graded approach.

3.1 Regulatory Scope of a Power Reactor Decommissioning Rulemaking

This section discusses the planned scope for a power reactor decommissioning rulemaking. The Commission provided the NRC staff with an initial scope for the decommissioning rulemaking in SRM-SECY-14-0118. The NRC staff issued an ANPR and a draft regulatory basis to request stakeholder input on the scope of the power reactor decommissioning rule. Based on the content of the ANPR and the draft regulatory basis, the technical evaluation provided in Appendices A through K of this document, and the NRC staff's consideration of public comments on the ANPR and the draft regulatory basis, the NRC staff concludes that there is sufficient regulatory basis to fulfill the Commission's explicit direction, as documented in SRM-SECY-14-0118, to proceed with rulemaking in certain areas to address regulatory requirements associated with power reactors transitioning to decommissioning. However, the NRC staff has determined that some areas discussed in SRM-SECY-14-0118 can be addressed using other regulatory alternatives.

The NRC staff has established sufficient regulatory bases to continue with rulemaking for the following areas:

- EP
- physical security
- cyber security
- drug and alcohol testing
- training requirements for CFHs
- DTFs
- offsite and onsite financial protection requirements and indemnity agreements
- application of backfitting provisions

Further, the NRC staff is recommending rulemaking to accomplish the following:

- Require that the decommissioning documents in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(bb); 10 CFR 50.82, "Termination of license"; and 10 CFR 52.110, "Termination of license," or a combination thereof, contain information on spent fuel management planning, in accordance with the regulatory requirements in 10 CFR 72.218, "Termination of licenses."

- Amend 10 CFR 51.53, "Postconstruction environmental reports," and 10 CFR 51.95, "Postconstruction environmental impact statements," to clarify the environmental reporting requirements and add a reference to 10 CFR 52.110.

- Amend 10 CFR 50.82(a) and 10 CFR 52.110 to clarify that licensees must evaluate the environmental impacts of decommissioning, and whether they are bounded, in the PSDAR.

- Amend 10 CFR 50.59(d)(3); 10 CFR 50.71(c); General Design Criterion 1, "Quality Standards and Records," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"; Criterion XVII, "Quality Assurance Records," of Appendix B, "Quality Assurance Criteria

for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50; and 10 CFR 72.72(d) to remove certain record-retention requirements for structures, systems, and components (SSCs) that no longer remain in service during decommissioning, as well as duplication requirements for spent fuel storage records.

- Amend 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, for investigating shipments of low-level radioactive waste (LLW) if the shipper has not received notification of receipt within 20 days after transfer, to allow a 45-day notification window based on operating experience that shows this is a reasonable delay for LLW shipments.

The NRC staff suggests in this regulatory basis that it can pursue alternatives other than rulemaking, such as the development of regulatory guidance, to address the following regulatory areas:

- minimum staffing for non-licensed operators, including CFHs
- the appropriate role of State and local governments in the decommissioning process
- the level of NRC review of the PSDAR
- the 60-year limit for power reactor decommissioning
- aging management

The NRC staff's regulatory basis recommends that the NRC maintain the status quo for fatigue management.

The NRC received public comments during the ANPR and draft regulatory basis public comment periods both for and against limiting the scope of the decommissioning rule. Some stakeholders advocated that the NRC limit the scope of the decommissioning rule to those areas in which the NRC has approved license amendments or exemptions. At a March 15, 2016, Commission meeting on the power reactor decommissioning rulemaking (ADAMS Accession No. ML16085A140), stakeholders discussed the potential "bifurcation" of the rulemaking, which would split the rulemaking into two separate rulemakings. In this approach, the first rule would focus on those areas in which the NRC has approved license amendments or exemptions, and the second rule would address the remaining Commission-directed scope in SRM-SECY-14-0118. The NRC staff received input from other stakeholders that the decommissioning rule should proceed as an integrated effort. These stakeholders argued that delaying consideration of portions of the rule would hamper the NRC's goal of comprehensively reviewing and revising the rules that govern the decommissioning process.

In SRM-SECY-14-0118, the Commission directed the NRC staff to proceed with an integrated rulemaking on decommissioning. 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 to submit its PSDAR for NRC approval, 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 nongovernmental stakeholders in the decommissioning process, and any other issues deemed relevant by the NRC staff. This regulatory basis considers the scope provided by the Commission in an integrated manner. At this time, the NRC staff's recommendation is to continue developing an integrated decommissioning rule.

3.2 Regulatory Objectives

The NRC is developing a proposed rule that would amend the current requirements for power reactors transitioning to 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. By issuing a decommissioning rule, the NRC would be able to 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) continue to provide reasonable assurance of adequate protection of public health and safety and the common defense and security at decommissioning power reactor sites; (2) ensure that the requirements for decommissioning power reactors are clear and appropriate; (3) codify those issues that are found to be generically applicable to all decommissioning power reactors and have resulted in the need for similarly worded exemptions or license amendments; and (4) identify, define, and resolve additional areas of concern related to the regulation of decommissioning power reactors.

In addition, the rulemaking would examine several policy issues related to decommissioning, including the role of State and local governments in the decommissioning process, the level of NRC review of the PSDAR, and the 60-year limit for completion of decommissioning.

Applicability to NRC Licenses and Approvals

The NRC envisions that some or all of the final 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
- current and future nuclear power reactors licensed under 10 CFR Part 52

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"[4] 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 SFP(s) to dry storage in an onsite ISFSI. For these facilities, the remaining decommissioning activities are primarily related to remediation of any remaining residual

[4] Given that the public comments referred to "standalone ISFSIs," this regulatory basis uses that same terminology. However, in accordance with IMC 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."

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; 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 NRC's 10 CFR Part 50 license for the site has been reduced to an area that only encompasses the ISFSI facility. 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.

Accordingly, the requirements of any rulemaking recommended by this regulatory basis 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. Any requirements recommended by this regulatory basis or implemented in the subsequent rulemaking activity that would apply to a standalone ISFSI/Decommissioned Reactor site would be consistent with the licensing actions that the NRC has already approved for that licensee.

In addition, the requirements of this rulemaking would not apply to ISFSI-only sites to the extent that their NRC-approved licensing bases have already been changed to reflect the reduced radiological risks remaining at the site (e.g., reduction of emergency preparedness, security, and insurance requirements; adoption of ISFSI-only technical specifications). During the proposed rule phase, the NRC staff will further examine the specific implementation issues associated with this rulemaking to ensure that there are no unintended consequences to ISFSI-only or standalone ISFSI/Decommissioned Reactor sites.

3.3 NRC Guidance, Policy, and Implementation Issues

This section describes the NRC guidance that the agency would need to revise and the relevant policy and implementation issues associated with a proposed rulemaking.

3.3.1 NRC Guidance

A proposed rulemaking would require the revision of existing guidance documents and the creation of new regulatory guidance documents to support the proposed rule. Appendices A through K to this document provide detailed information on the need to revise or create regulatory guidance in each technical area.

Currently, the NRC expects to issue for comment with the proposed rule new or revised draft guidance in the areas of EP (Appendix A), minimum staffing for non-licensed operators (Appendix E), decommissioning trust funds (Appendix F), and current regulatory approaches to decommissioning (Appendix H). Guidance for all other appendices of this document is not needed to implement the recommended rule changes. Additional clarifying guidance may be developed outside of the rulemaking process.

3.3.2 Policy Issues

Appendices A through K to this document describe the policy issues associated with each area under consideration in this regulatory basis.

3.3.3 Implementation Issues

Appendices A through K to this document describe the implementation issues in each regulatory area. However, an overarching implementation issue for this rulemaking is the expected transition of multiple operating power reactors to decommissioning status before publication of the final rule (e.g., Oyster Creek, Pilgrim, and Three Mile Island). Licensees that are transitioning facilities to decommissioning status during the implementation period may need specialized implementation provisions. The NRC staff will consider implementation issues in more detail during the development of the final rule.

4 IMPACTS OF THE RULEMAKING

4.1 Impact on Reactor Licensees

Appendices A through K to this document summarize the impacts of the rulemaking on reactor licensees for each technical area.

Among the NRC goals in amending these regulations is to provide for an efficient decommissioning process that would reduce the need for exemptions for existing regulations and license amendment requests.[5] In this respect, several of the options presented in this regulatory basis may result in a reduction in burden on licensees; these reductions in burden (e.g., fewer licensing actions) are discussed more fully in each appendix. Options associated with rulemaking might have slight costs to licensees for reviewing a proposed rule and submitting to the NRC comments on the proposed rule. The NRC staff is also evaluating if any options in this rulemaking may constitute backfitting. Section 6 of this regulatory basis, "Backfitting and Issue Finality," discusses this subject in more detail. The NRC staff will complete its analysis to show whether any of these areas would be necessary for adequate protection or constitute a cost-justified substantial increase in the protection of public health and safety or the common defense and security.

To accompany the draft regulatory basis, the NRC staff performed a preliminary draft regulatory analysis to determine the impacts of this rulemaking on NRC staff and reactor licensees. This preliminary draft regulatory analysis contained the NRC staff's initial evaluation of the costs and benefits associated with each regulatory option considered in the draft regulatory basis. The NRC published the preliminary draft regulatory analysis, "Regulatory Improvements for Power Reactors Transitioning to Decommissioning," for public comment in the *Federal Register* (82 FR 21481) on May 9, 2017. The NRC staff is updating the preliminary draft regulatory analysis based on public comments and has updated the conclusions regarding the costs and benefits in this regulatory basis. The NRC staff intends to make the updated preliminary regulatory analysis publicly available in the near term. The NRC will publish a draft regulatory analysis for comment concurrent with the proposed rule package, which is currently anticipated to be published 2018. The full extent of the impacts of this rulemaking, for both current and new reactor licensees, is not known at this time.

4.2 Impact on the NRC

Overall, this rulemaking would result in a significant one-time cost to the NRC followed by ongoing savings:

- Initially, the NRC would incur incremental costs to undertake the rulemaking process. These costs include the preparation of the regulatory basis, the proposed and final rules, and accompanying guidance. The costs would include both staff and contractor time to prepare proposed rule language, draft guidance, supporting analyses (e.g., a regulatory analysis and Office of Management and Budget (OMB) Paperwork Reduction Act Burden analysis), and an FRN and to conduct public outreach efforts during rule and guidance development. After publishing the proposed rule, the NRC would incur costs

[5] As discussed in Section 1 of this regulatory basis, "Executive Summary," the NRC's goals in amending these regulations are to provide for an efficient decommissioning process; reduce the need for exemptions from existing regulations and license amendment requests; address other decommissioning issues deemed relevant by the NRC staff; and support the principles of good regulation, including openness, clarity, and reliability.

associated with resolving public comments and preparing the final rule, guidance, and supporting documentation for the rulemaking.

- By changing the current regulatory framework (i.e., the decommissioning exemption and amendment process) to align the relevant regulations with the reduced level of risk, the NRC would save resources over time. That new regulatory framework would obviate the need for exemptions and license amendment requests, reducing both the number and complexity of the licensing action requests. These changes would result in a more efficient process and save the staff time and resources.

- By establishing a graded approach for EP for decommissioning reactors, the NRC staff would incur administrative burden associated with reviewing updated emergency plans for decommissioning reactors transitioning between levels.

4.3 Impact on Public Health and Safety

For the majority of the regulatory areas discussed in this document, the need for a power reactor decommissioning rulemaking is not based on safety or security concerns. Regulatory changes in these areas are aimed at making the decommissioning process more efficient, predictable, or clear. Thus, for these areas, a power reactor decommissioning rule would have no impact on public health and safety or the common defense and security. However, consistent with the Commission's direction in SRM-SECY-14-0118, the NRC staff recognized cyber security as a relevant issue that needs to be addressed. As discussed in Appendix C to this document, rulemaking in this area would ensure 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.

Several comments on the ANPR and draft regulatory basis requested that the NRC consider any environmental impacts as a result of changes in EP requirements. The NRC will prepare an EA for the rulemaking that will address any environmental impacts associated with this rulemaking for decommissioning reactors. The EA will be available for public comment with the proposed rule.

4.4 Impact on State, Local, or Tribal Governments

This rulemaking may impact State, local, or Tribal governments. Options associated with rulemaking might have slight costs to these stakeholders for reviewing a proposed rule and submitting to the NRC comments on the proposed rule. With regard to the current regulatory approach for decommissioning reactors, the Commission tasked the NRC staff with evaluating the appropriate role of State and local governments in the decommissioning process. Appendix H to this document contains the NRC staff's evaluation. As stated in Appendix H, the NRC staff is considering additional enhancements or overall improvements to NRC's guidance on the role of the States and local governments, members of the public, and other external stakeholders in the decommissioning process. As described in detail in Appendix H, the NRC staff recommends several enhancements to guidance on public participation in the decommissioning process. However, based on an initial evaluation of the authority and jurisdiction given to the NRC by the Atomic Energy Act (AEA), there is no basis for the NRC to mandate participation in the decommissioning process by any external stakeholders.

5 STAKEHOLDER INVOLVEMENT

The NRC staff published an ANPR in the *Federal Register* on November 19, 2015 (80 FR 72358), to gather public comment to inform the NRC effort to draft a proposed rule regulatory basis addressing issues associated with power reactor decommissioning. The ANPR was available for comment for 150 days. The NRC staff also held a public meeting on December 9, 2015, to afford external stakeholders an opportunity to ask the NRC staff clarifying questions about the ANPR. The NRC staff detailed the results of this public meeting in a meeting summary (ADAMS Accession No. ML15362A099). The NRC summarized the main themes from the public comments received on the ANPR in Chapter 5 of the draft regulatory basis.

The NRC staff held several meetings with industry and other stakeholders related to decommissioning power reactors. The NRC staff held a session on decommissioning at the Regulatory Information Conference on March 10, 2016. During this session, various stakeholders expressed their views on the decommissioning process and potential rulemaking, and the NRC staff engaged with the public during a question and answer session. In addition, on March 15, 2016, the Commission held a public meeting on the power reactor decommissioning rulemaking. This meeting was composed of three panels (i.e., staff, State and local government representatives, and industry and other stakeholders) and covered a wide range of perspectives from the NRC staff and interested stakeholders.

The NRC staff made a preliminary version of the draft regulatory basis available on its Web site on March 10, 2017, to facilitate discussions at a Regulatory Information Conference session on decommissioning on March 15, 2017 (ADAMS Accession No. ML17294A490). The NRC staff then published the draft regulatory basis in the *Federal Register* on March 15, 2017 (82 FR 13778), to gather public comment to inform the NRC rulemaking effort. The draft regulatory basis was available for comment for 90 days. The NRC held a public meeting May 8–10, 2017, to afford external stakeholders an opportunity to ask the NRC staff clarifying questions about the draft regulatory basis. The NRC staff detailed the results of this public meeting in a meeting summary (ADAMS Accession No. ML17157B211). To accompany the draft regulatory basis, the staff also made available for comment a preliminary draft regulatory analysis that contained the staff's initial analysis of the costs and benefits associated with each regulatory option considered in the draft regulatory basis.

5.1 NRC Observations on Stakeholder Feedback on the Draft Regulatory Basis

The public comment period for the draft regulatory basis and the preliminary draft regulatory analysis closed on June 15, 2017. The NRC received 40 comment submissions, which are summarized below and available for detailed review in regulations.gov under Docket ID NRC-2015-0070. The NRC staff reviewed the stakeholder feedback received on the draft regulatory basis and preliminary draft regulatory analysis to inform the development of this regulatory basis, as well as a revised preliminary draft regulatory analysis that will be issued in the near term. The NRC staff received stakeholder feedback in every technical area included in the scope of the draft regulatory basis. In many cases, this was a direct result of the NRC staff's questions posed in the FRN for the draft regulatory basis. Figure 1 gives the distribution of public comment submissions on the draft regulatory basis, by source.

Appendices A through K to this document include detailed observations on stakeholder feedback in each regulatory area.

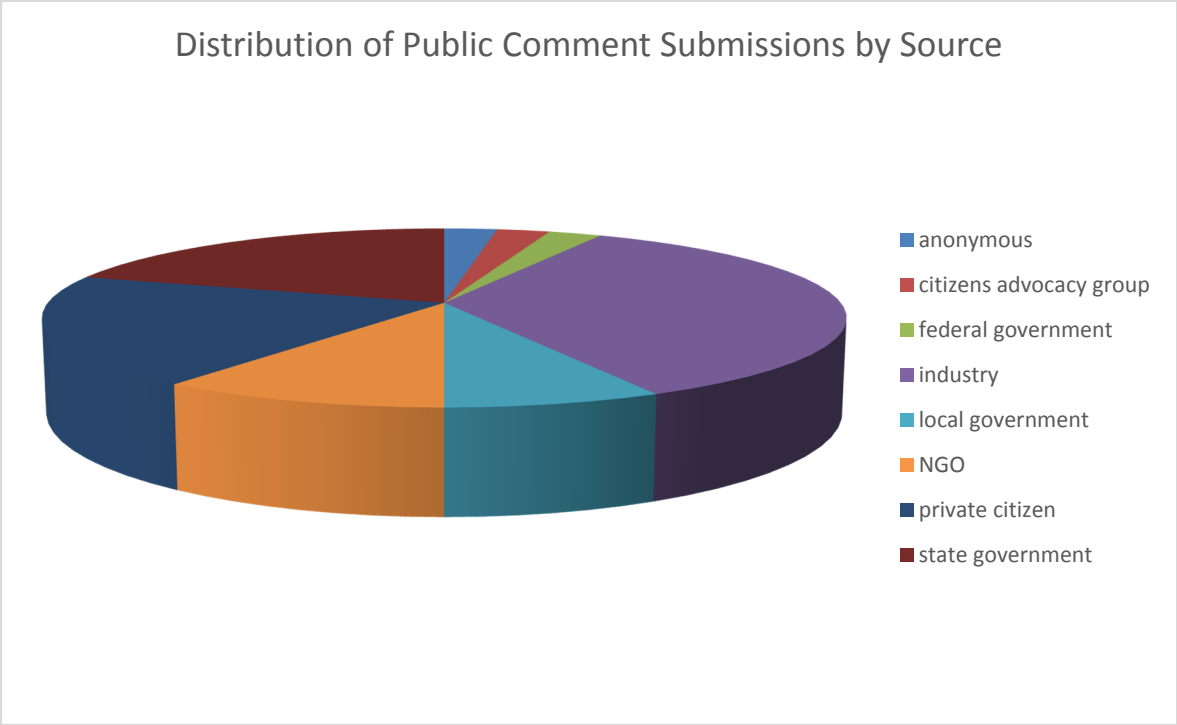

Figure 1 Sources of public comments received on draft regulatory basis and preliminary draft regulatory analysis

Table 1 provides references to the public comments received on the draft regulatory basis and preliminary draft regulatory analysis.

Table 1 ADAMS References for Public Comment Submissions on the Draft Regulatory Basis and Preliminary Draft Regulatory Analysis

Comment Number	Commenter Affiliation	Accession Number
1	Anonymous	ML17109A034
2	Private citizen	ML17123A234
3	Industry	ML17139D433
4	Private citizen	ML17143A445
5	Private citizen	ML17143A446
6	Private citizen	ML17158B389
7	Local government	ML17165A204
8	Private citizen	ML17165A205
9	State government	ML17165A206
10	Industry	ML17165A196
11	Nongovernmental organization	ML17165A197
12	Industry	ML17165A198
13	Industry	ML17165A199
14	Local government	ML17165A200
15	Industry	ML17165A201
16	State government	ML17165A202
17	Private citizen	ML17165A203
18	Industry	ML17165A334
19	Industry	ML17165A335
20	Industry	ML17165A336
21	Local government	ML17165A337
22	Industry	ML17165A327
23	Nongovernmental organization	ML17165A328
24	State government	ML17165A329
25	Industry	ML17165A330
26	Private citizen	ML17165A332
27	Nongovernmental organization	ML17165A333
28	Industry	ML17165A382
29	Industry	ML17165A383
30	State government	ML17165A384
31	State government	ML17165A385
32	State government	ML17165A386
33	State government	ML17165A378
34	State government	ML17165A379
35	Nongovernmental organization	ML17165A380
36	Private citizen	ML17165A381
37	Citizen advocacy group	ML17165A393
38	Industry	ML17166A085
39	Federal Government	ML17167A124
40	Industry	ML17173A632

5.1.1 Stakeholder Feedback

The NRC staff reviewed the public comment submissions referenced above to identify comments in each regulatory area discussed in Appendices A through K to this document.

5.1.2 Specific Requests for Comments

In the FRN for the draft regulatory basis, the NRC staff posed 4 general questions and 10 requests for comment in specific regulatory areas. The NRC staff received feedback on

each of these questions, which it used in development of this regulatory basis. The public comments can be found on regulations.gov under Docket ID NRC-2015-0070. Additionally, the appendices to this document discuss the specific requests for comment and the associated public comment themes pertaining to them. The NRC specifically requested comments on two subjects that are not covered in Appendices A through K of this regulatory basis: (1) foreign ownership, control, or domination (FOCD) exemptions for facilities in decommissioning and (2) potential changes to 10 CFR Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material." Below, in question 5 and questions 6-9, the NRC staff summarizes these associated questions, comment responses received, and the NRC staff positions in these two areas.

Question 5: Foreign Ownership, Control, or Domination Exemptions for Facilities in Decommissioning

A licensee in decommissioning may desire to transfer its license under 10 CFR Part 50 to another entity to perform the decommissioning activities described in the licensee's PSDAR. However, pursuant to 10 CFR 50.38, "Ineligibility of certain applicants," the receiving entity is ineligible to obtain the license if it is a citizen, national, or agent of a foreign country, or if it is any corporation or other 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. The NRC has granted exemptions from this requirement for facilities that have been dismantled and removed such that only ISFSIs remained on site (78 FR 58571; September 24, 2013).

The NRC asked whether it should address the exemption to 10 CFR 50.38 for licensees of facilities in decommissioning on a generic basis as a part of this rulemaking. If so, the NRC asked commenters to indicate why and how the NRC should address this issue.

The NRC received six comment submittals about whether it should revise the FOCD regulations in 10 CFR 50.38 as part of this rulemaking.

Three commenters supported revising the FOCD regulations in 10 CFR 50.38 to remove the FOCD prohibition for licensees in decommissioning as part of this rulemaking. The commenters stated that the FOCD provisions in the AEA and NRC regulations only apply to production and utilization facilities; a reactor in decommissioning that is permanently defueled and no longer authorized to operate should no longer be considered as such a facility.

Three commenters recommended that the NRC not consider such a revision to the FOCD regulations at 10 CFR 50.38. Two commenters generically expressed that there should be no exemption to 10 CFR 50.38. The third commenter further suggested that no foreign power should be allowed to take title to a facility while spent nuclear fuel, greater-than-Class-C waste, or high-level radioactive materials remain on site.

NRC Staff Response

The NRC staff agrees with the public comments in that the NRC could amend 10 CFR 50.38 to specify that the FOCD prohibition does not apply to power reactor facilities: (1) for which the licensee has submitted certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, pursuant to 10 CFR 50.82(a)(1), and (2) that have been modified to be incapable of making use of special nuclear material without significant plant alterations. Amending the regulation in this way would be consistent with the AEA, the Commission's regulations, and NRC precedent. As a result, applications for transfer of licenses

for such permanently shutdown power reactor facilities would not have to address 10 CFR 50.38.

The NRC currently reviews the issue of FOCD for direct or indirect license transfer requests for permanently shutdown power reactor facilities in the same way that it reviews the issue for all power reactor facility license issuances. Thus, the NRC currently does not give its consent in writing to the transfer of a license for a permanently shutdown power reactor facility if the transfer is to any person who is a citizen, national, or agent of a foreign country, or to any corporation or other entity that the NRC knows or has reason to believe is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

However, the NRC staff can read the AEA, the Commission's regulations, and NRC precedent such that the FOCD prohibition does not apply to permanently shutdown power reactor facilities. Specifically, the FOCD provisions of AEA Sections 103d. and 104d. apply to licenses for utilization and production facilities. The AEA defines "utilization facility" as follows:

> (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.

In 10 CFR 50.2, the NRC defines "utilization facility," in part, as "[a]ny nuclear reactor other than one designed or used primarily for the formation of plutonium or U-233," and it also defines "nuclear reactor" as "an apparatus, other than an atomic weapon, designed or used to sustain nuclear fission in a self-supporting chain reaction."

In LBP-84-33, *Cincinnati Gas & Electric Company* (Wm. H. Zimmer Nuclear Power Station, Unit 1), 20 NRC 765 (1984), an Atomic Safety and Licensing Board determined that, since a utilization facility is a facility that is capable of making use of special nuclear material, in order for a facility to not be a utilization facility, it must be modified to prevent its utilization of special nuclear material such as by severing and welding caps on main feedwater lines and main steam lines and removing the fuel and control rod drive mechanisms.

Additionally, 10 CFR 50.82(a)(2) states the following:

> Upon docketing of 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 10 CFR part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel.

Taking this statutory and regulatory language and case law together, the NRC could amend 10 CFR 50.38 such that its FOCD prohibition would not apply to permanently shutdown power reactor facilities where the facility licensee is prohibited from using the nuclear reactor to sustain nuclear fission in a self-supporting chain reaction by 10 CFR 50.82(a)(2) and where the nuclear reactor's design has been modified so that it cannot sustain nuclear fission in a self-supporting chain reaction without significant plant alterations.

This conclusion is consistent with the NRC's findings as part of a 2013 exemption request. Specifically, pursuant to 10 CFR 50.12, the NRC issued exemptions from 10 CFR 50.38 to the Maine Yankee Atomic Power Company, Connecticut Yankee Atomic Power Company, and Yankee Atomic Electric Company (the Yankee Companies), which held 10 CFR Part 50 possession-only licenses for Maine Yankee Atomic Power Station, Haddam Neck Plant, and Yankee Nuclear Power Station (the Yankee Facilities), respectively (78 FR 58571; September 24, 2013). The Yankee Facilities had permanently ceased power operations between 1991 and 1997 and, as of the time of the issuance of the exemptions, all of their reactor plant facilities had been dismantled and removed such that only ISFSIs remained on site. The NRC found that the exemptions were authorized by law because the FOCD prohibition of AEA Section 103d. did not apply to the Yankee Facilities because they were essentially ISFSIs, and an ISFSI is not capable of making use of special nuclear material and is not a nuclear reactor. The NRC found that the exemptions from 10 CFR 50.38 presented no undue risk to public health and safety because the regulation is intended to prevent the FOCD of utilization facilities and the Yankee Facilities were no longer utilization facilities. Further, the FOCD prohibition is a restriction on financial ownership and is neither a technical nor an operational requirement; as such, granting the exemption has no bearing on the risk to public health and safety. The NRC found that the exemptions from 10 CFR 50.38 were consistent with the common defense and security because the Yankee Facilities were restricted by their licenses to storing spent nuclear fuel in approved ISFSIs and because similarly situated 10 CFR Part 72 ISFSIs with similar security and common defense concerns do not have FOCD restrictions. The NRC found that special circumstances applied because the application of 10 CFR 50.38 in the particular circumstances would not serve the underlying purpose of 10 CFR 50.38, which is to implement the FOCD prohibition of AEA Sections 103d. and 104d. The underlying purpose of those AEA sections, in turn, is to prevent the FOCD of utilization facilities. In this regard, the Yankee Facilities were no longer utilization facilities. Based on these findings, the NRC concluded that granting the exemptions was acceptable.

The revision to 10 CFR 50.38 being considered would make the FOCD prohibition inapplicable to permanently shutdown power reactor facilities for which the licensee has submitted certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel and that have been modified to be incapable of making use of special nuclear material without significant plant alterations. Any proposed transfer of the licenses of these facilities, however, would still be subject to an inimicality review. Specifically, 10 CFR 50.80(c) states that the Commission will approve an application for the transfer of a 10 CFR Part 50 operating license or a 10 CFR Part 52 combined 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 pursuant thereto. Furthermore, 10 CFR 50.57, "Issuance of operating license," and 10 CFR 52.97, "Issuance of combined licenses," state that the NRC may issue a 10 CFR Part 50 operating license or a 10 CFR Part 52 combined license only if the Commission finds that the issuance of the license will not be inimical to the common defense and security or to the health and safety of the public.

When determining whether the issuance of a license is inimical to the common defense and security, the NRC reviews and considers foreign involvement in a licensing action (e.g., ownership, control, or influence). For example, the NRC staff may need to consider any security (i.e., inimicality) implications of a foreign entity owning Category I quantities of strategic special nuclear material, as defined by NRC regulations. Additionally, the NRC staff may need to consider whether mitigation measures would need to be implemented to ensure that the disposition of spent nuclear fuel remains under the control of a U.S. entity (e.g., company, board

of directors, key management personnel) until such time as the U.S. Department of Energy (DOE) takes possession of the fuel. Therefore, although 10 CFR 50.38 could be amended to specify that the FOCD prohibition does not apply to permanently shutdown power reactor facilities for which the licensee has submitted certifications described in 10 CFR 50.82(a)(1) and that have been modified to be incapable of making use of special nuclear material without significant plant alterations, any application for transfer of a license for such a facility would still have to discuss foreign involvement in order to satisfy the NRC's separate inimicality review.

Based on this evaluation, the NRC staff recommends amending the FOCD requirement in 10 CFR 50.38 to specify that, consistent with AEA Sections 103 and 104, it applies to production and utilization facilities. The NRC staff also recommends amending the FOCD requirement in 10 CFR 50.38 to specify that it does not apply to a power reactor facility after the licensee has submitted the certifications described in 10 CFR 50.82(a)(1) and the facility has been modified to be incapable of making use of special nuclear material without significant plant alterations. This would eliminate the need for an application for the transfer of such a facility to address the FOCD requirement, but it would not eliminate the need for the application to address the inimicality requirement, including the potential effect of any foreign involvement on inimicality.

Questions 6–9: Potential Changes to 10 CFR Part 37

The NRC issued the regulations in 10 CFR Part 37 to establish security requirements for the use and transport of risk significant quantities of Category 1 and Category 2 radioactive material. Category 1 and Category 2 thresholds of radioactive materials in 10 CFR Part 37 are consistent with categories of radioactive materials established by the International Atomic Energy Agency in its *Code of Conduct on the Safety and Security of Radioactive Sources* (available at http://www-ns.iaea.org/tech-areas/radiation-safety/code-of-conduct.asp?s=3). The objective of 10 CFR Part 37 is to provide reasonable assurance that licensees can protect risk significant radioactive materials against theft or diversion. The current 10 CFR Part 37 regulation is applicable to any licensee that possesses an aggregated Category 1 or Category 2 quantity of radioactive material, any licensee that transports these materials using ground transportation, and any licensee that transports small quantities of irradiated reactor fuel.

Both operating and decommissioning power reactor licensees are subject to the physical protection programs contained in 10 CFR Part 73. Specifically, licensees must comply with 10 CFR 73.55, as well as Appendix B and Appendix C to 10 CFR Part 73. In addition to the requirements in 10 CFR Part 73, reactor licensees must also comply with the requirements in 10 CFR Part 37 if they possess Category 1 or Category 2 quantities of radioactive material. The requirements in 10 CFR Part 37 provide exemptions for licensees with security plans under 10 CFR Part 73 to the extent that the materials activities (e.g., those associated with Category 1 and Category 2 quantities of radioactive material) are included in the licensees' Part 73 security plans. However, operating experience has indicated that there are additional areas in which exemptions may be warranted to alleviate licensees from being subject to both 10 CFR Part 73 and 10 CFR Part 37 security regulations. To address the potential impact of redundant security regulations during decommissioning, the NRC is considering revising security regulations, including addressing the physical security requirements for Category 1 and Category 2 quantities of radioactive material at facilities undergoing decommissioning.

Therefore, in the FRN for the draft regulatory basis, the NRC requested comments on whether NRC should consider changes to how 10 CFR Part 37 applies to reactors in decommissioning. The NRC received 13 comments in this area. Members of the industry predominantly

commented that the rulemaking process should address the issues raised in the questions in the FRN, should consider changes to the application of Part 37 at decommissioning reactors, and should include the entire decommissioning period. State and local governments provided the comments that the rulemaking should not address the questions in the FRN but that these issues should be considered on a site-by-site basis, that radioactive material should be protected onsite through specific requirements, and that NRC should correct the formula for calculation of the sum of fractions in 10 CFR Part 37. Other comments noted that the NRC should not make changes to the application of 10 CFR Part 37 to decommissioning reactors.

NRC Staff Response

The NRC has decided to address the applicability of 10 CFR Part 37 to decommissioning reactors as part of an integrated rulemaking effort that will consider multiple issues related to materials safety and security, including issues raised in an existing petition for rulemaking (PRM) submitted by NEI. In June 2015, the NRC staff closed the docket for PRM-37-1 (80 FR 33450) and determined that the issues raised by NEI in the PRM would be considered in rulemaking. NEI requested, in the PRM, that the NRC amend 10 CFR Part 37 to clarify and expand current exemptions in the rule pertaining to when physical protection measures for Category 1 and Category 2 quantities of radioactive material do not apply to a licensee with a 10 CFR Part 73 physical security plan.

Consistent with the commitment made in SECY-17-0025, "Update on Source Security and Accountability Activities," dated February 17, 2017 (ADAMS Accession No. ML16344A109), the NRC staff plans to submit an integrated rulemaking plan to the Commission. This rulemaking plan will address concerns identified in PRM-37-1, as well as other issues identified by the NRC staff as a result of the 10 CFR Part 37 program review and the NRC response to Government Accountability Office (GAO) investigation report GAO-16-330, "NRC Has Enhanced the Controls of Dangerous Radioactive Materials, but Vulnerabilities Remain" (https://www.gao.gov/products/GAO-16-330). The working group that responded to that report recommended efforts that will require rulemaking for 10 CFR Parts 30, 37, 40, and 70. In order to maximize efficiency and minimize the cumulative effects of regulatory changes on byproduct materials licensees, the NRC will address the PRM along with the other changes impacting 10 CFR Part 37 and other radioactive material regulations in an integrated rulemaking rather than as part of the decommissioning rulemaking. This approach enhances the NRC staff's ability to address all of the issues related to rulemaking for physical protection measures for Category 1 and Category 2 quantities of radioactive material in an efficient manner.

Until the integrated rulemaking is complete, Enforcement Guidance Memorandum (EGM) EGM-14-001, "Interim Guidance for Dispositioning 10 CFR Part 37 Inspection Findings with Respect to Large Components and Robust Structures at Facilities Licensed Under 10 CFR Parts 50 and 52," dated March 13, 2014 (ADAMS Accession No. ML14056A151), provides enforcement discretion for noncompliance with current 10 CFR Part 37 requirements with respect to large components and robust structures containing Category 1 or Category 2 quantities of radioactive material at power reactor facilities licensed under 10 CFR Parts 50 and 52. EGM-14-001 will remain effective until the underlying technical issue is dispositioned through the integrated rulemaking process or other regulatory action. In addition, decommissioning reactors that possess radioactive waste that contain Category 1 or Category 2 quantities of radioactive material may also be exempt from the requirements of 10 CFR Part 37, Subparts B, C, and D if they meet the exemption requirements in 10 CFR 37.11(c). NUREG-2155, Revision 1, "Implementation Guidance for 10 CFR Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material," issued January, 2015

(ADAMS Accession No. ML15016A172) provides clarifying guidance on exemption requirements and what the NRC considers "waste" for the purposes of 10 CFR Part 37.

5.1.3 Public Comment Themes

The following discussion summarizes the general feedback received from each group of stakeholders.

Private Citizens and Citizen Advocacy Groups

In general, private citizens and citizen advocacy groups provided the following feedback:

- These stakeholders opposed any relaxation of EP, security, or insurance requirements while fuel is still in the SFP.

- These stakeholders supported an increased role for State and local governments and public groups in the decommissioning process. Many of these stakeholders advocated that the NRC require the formation of a community advisory panel to enhance the opportunity for public involvement in the decommissioning process.

- These stakeholders generally supported increased oversight and additional funding of the DTFs. In addition, many commenters expressed a concern that the 60-year limit for decommissioning was being used primarily to grow sufficient funds for decommissioning rather than for the purpose of reducing worker exposure and waste disposal costs.

- Several stakeholders stated that the decommissioning process should require additional National Environmental Policy Act reviews.

- Most of these stakeholders requested that the NRC return the PSDAR to a document that requires formal NRC approval and a site-specific environmental review under NEPA and that provides an opportunity for a hearing.

- Many of these stakeholders requested that the NRC require removal or transfer of fuel from the SFP to dry cask storage as soon as possible.

- Some stakeholders commented on decommissioning issues related to specific licensees.

Nongovernmental Organizations

The NRC staff received varied feedback from nongovernmental organizations. Some of the nongovernmental organizations echoed the concerns expressed in comments received from private citizens and citizen advocacy groups. Other nongovernmental organizations generally supported changes to the regulatory framework for decommissioning reactors and included specific suggestions on potential changes. Some nongovernmental organizations provided detailed feedback on the issues considered in Appendices A through K to this regulatory basis.

Federal, State, and Local Governments

The NRC staff received significant feedback from Federal, State, and local governments. In general, these groups gave the following feedback.

- FEMA requested that the NRC continue to coordinate with FEMA throughout the power reactor decommissioning rulemaking process.

- State governments commented that excess DTF funds should not be allowed for specific uses authorized under regulatory exemptions (i.e., spent fuel management and 10 CFR Part 72 specifically licensed ISFSI decommissioning) and that the NRC should consider more accurate predictors of decommissioning costs.

- Several State governments provided specific input on the use of DTFs and suggestions for improving the regulatory framework for decommissioning power reactors.

- Several State governments indicated that as long as spent nuclear fuel is on site, governments will need to maintain the capability to respond to any situation related to the site.

- One State government reiterated its previous comments on the ANPR that the PSDAR should be approved by the NRC, the PSDAR should include more detail about environmental impacts, and the NRC should conduct a site-specific NEPA analysis. The State also noted that an environmental impact statement should accompany the rulemaking.

- State governments suggested that the NRC should provide other opportunities for meaningful public input and involvement in the decommissioning process.

- Several State governments suggested that the NRC should expressly recognize State authority over the nonradiological activities associated with the decommissioning process.

- Several State governments also provided specific suggestions in many technical areas.

- Several State governments requested that ERDS data continue to be made available until all fuel is removed from the SFP.

- Several stakeholders generally opposed the relaxation of EP requirements until the spent fuel is removed from the SFP.

- Several stakeholders expressed concern about the economic impacts of decommissioning.

- Several stakeholders supported an increased role for the State and local governments and public groups in the decommissioning process, and many of these stakeholders advocated that the NRC require the formation of a community advisory panel. Some stakeholders also requested that licensees demonstrate reduced risk to local communities before the NRC grants exemptions.

- Several stakeholders suggested that the 60-year limit for decommissioning is too long and results in extended socioeconomic impacts throughout this period.

- Several stakeholders expressed concern that local jurisdictions will face increased burden associated with emergency response and preparedness if staffing, insurance, qualifications, and training requirements are reduced. These stakeholders requested that EP funding be maintained at current levels.

- Several stakeholders supported the concept of a graded approach to EP but requested that site-specific characteristics such as geography, population, and infrastructure be considered in establishing each level.

Licensees and Industry Representatives

The NRC also received comments on the draft regulatory basis from licensees and industry representatives. In general, licensees and industry representatives gave the following feedback.

- The NRC should proceed with a rulemaking to modify the requirements applicable to reactors undergoing decommissioning in order to appropriately align the regulatory requirements with the reduced risk profile associated with those facilities.

- The industry indicated that the proposed changes to the current rules are generally consistent with licensing actions that the NRC has approved (i.e., license amendments and exemptions) and would achieve the stated objective to implement appropriate regulatory changes that reduce the number of licensing actions needed during decommissioning.

- The rulemaking scope should be limited to those areas that have required licensing activity and are consistent with areas addressed in SECY-00-0145. Members of industry indicated that they do not believe rulemaking should be used for public engagement aspects because these are site-specific issues. Further, members of industry indicated that they do not feel that any additional resources should be devoted to the majority of the activities addressed in Appendix H (current regulatory approach to decommissioning).

- The industry has concerns with the imposition of additional requirements related to DTFs, fitness for duty, and aging management.

- The NRC should consider rule language provided by industry in areas in which it recommends rulemaking and include case law references to clarify its authority.

- The NRC should clarify the applicability of this rule to “ISFSI-only” versus “standalone-ISFSI” sites.

- Site-specific cost estimates should not replace the table of minimum amounts when considering funding assurance for DTFs as no greater accuracy would be achieved over the use of the NRC’s minimum formula. However, the industry did not object to the codification of commingling and expressed interest in the 1-percent option for the use of DTF funds during the transition period into decommissioning and requested further clarification and examples.

- One industry stakeholder suggested removing the language from 10 CFR 72.218 pertaining to “a plan for removal of the spent fuel stored under the general license from

the reactor site," rather than requiring that the PSDAR address this issue as the NRC staff recommends in Appendix H. The commenter contends that only DOE can provide such a plan to the NRC since the ultimate responsibility for the fuel lies with it.

- There were several comments received regarding capturing "post-transition" decommissioning exemptions such as recordkeeping and transportation issues.

The next opportunity for the public to provide feedback on this rulemaking would be when the NRC publishes the proposed rule for public comment in the *Federal Register*, which is expected in 2018.

5.2 Planned Interactions with the Advisory Committee on Reactor Safeguards

The NRC staff is providing the regulatory basis to the Advisory Committee on Reactor Safeguards (ACRS) at the time of publication. The staff will brief the ACRS on the regulatory basis if requested and will follow normal rulemaking processes for ACRS engagement during the power reactor decommissioning rulemaking process.

6 BACKFITTING AND ISSUE FINALITY

6.1 Backfitting and Issue Finality

The power reactor decommissioning rulemaking may make generically applicable certain exemptions from regulatory requirements associated with EP, physical security, cyber security, DTFs, record retention, LLW transportation, and offsite and onsite financial protection and indemnity agreements that have been issued on facility-specific bases for individual decommissioning power reactors. Further, through this rulemaking effort, the NRC will consider the application of backfitting provisions to decommissioning power reactors. The NRC is also recommending rulemaking regarding drug and alcohol testing, training requirements for CFHs for decommissioning reactors, consideration of environmental impacts, and the inclusion of spent fuel management planning information in decommissioning documents.

The NRC does not expect that the proposed rule would introduce new requirements for licensees. Any new provisions in the proposed rule would be voluntary options, clarifications, or relaxations to current requirements.

The NRC's backfitting provisions for holders of CPs and operating licenses appear in 10 CFR 50.109, "Backfitting" (the Backfit Rule). Issue finality provisions (analogous to the backfitting provisions in 10 CFR 50.109) for applicants and holders of combined licenses are in 10 CFR 52.83, "Finality of referenced NRC approvals; partial initial decision on site suitability," and 10 CFR 52.98, "Finality of combined licenses; information requests." The sections below consider backfitting and issue finality as applied to these entities and regulatory approvals.

6.2 Current and Future Applicants

Applicants and potential applicants (for licenses, permits, and regulatory approvals such as design certifications) are not, with certain exceptions, protected by 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 (54 FR 15372, at 15385–15386; April 18, 1989).

The exceptions to the 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 would be the subject of a reactor decommissioning proposed rule, and the proposed rule would not contain design requirements. Therefore, the proposed rule provisions that would be limited to reactor decommissioning would not be inconsistent with the issue finality provisions applicable to early site permits and design certifications. In addition, because the issues that are resolved in an early site permit or a design certification and accorded issue finality do not address power reactor decommissioning, a combined license applicant referencing either an early site permit or a design certification would not be protected by the issue finality provision applicable to combined license applicants (10 CFR 52.83) with respect to compliance with a rule setting forth requirements for power reactor decommissioning.

6.3 Existing Design Certifications

The issues that are resolved in a design certification and accorded issue finality do not include decommissioning matters that would be the subject of a reactor decommissioning proposed rule. Therefore, a rulemaking limited to reactor decommissioning would not be applied to existing (or future) design certifications.

6.4 Existing Licensees

To the extent that a proposed rule would codify certain regulatory exemptions from regulatory requirements associated with EP, physical security, DTFs, record retention, LLW transportation, and onsite and offsite insurance for decommissioning power reactors, a proposed rule, as applied to existing licensees, would not constitute a new instance of backfitting under 10 CFR 50.109 or an inconsistency with the issue finality provisions applicable to holders of combined licenses in 10 CFR 52.98. A proposed rule that would codify these exemptions would not impose upon licensees in decommissioning any new or changed requirements because these licensees would already be acting under the exemptions. A rulemaking as described in the appendices to this regulatory basis could include certain regulations that would provide an alternative set of requirements for licensees transitioning to decommissioning and would not constitute backfitting or a violation of issue finality. For other changes, such as requirements that exceed those resulting from certain exemptions from regulatory requirements previously issued for decommissioning facilities, the NRC staff would address the applicable backfitting and issue finality provisions with respect to the added requirements as part of the rulemaking.

7 REGULATORY FLEXIBILITY ACT

The Regulatory Flexibility Act, enacted in September 1980, requires agencies to consider the impact of their regulatory proposals on small entities, analyze alternatives that minimize small entity impacts, and make their analyses available for public comment.

None of the licensees or CP holders fall within the definition of “small entities” set forth by the NRC in 10 CFR 2.810, “NRC size standards.” Therefore, a proposed rulemaking would not have a significant economic impact on a substantial number of small entities.

8 COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT

This regulatory basis contemplates changes to the NRC's decommissioning regulatory framework. If the NRC determines to pursue rulemaking that would authorize activities not considered in the 1996 final rule, such as EP requirements, the NRC will evaluate the environmental impacts of any newly authorized activities. The agency will make any document prepared to comply with the National Environmental Policy Act available for public comment with the proposed rule.

9 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).

This regulatory basis does not currently contain any new regulatory impositions. Rather, it supports a rulemaking that aligns the regulations related to power reactor decommissioning with the reduced level of risk to the public health and safety at a power reactor decommissioning facility.

As stated above in Section 6, if the proposed rule includes any requirements that exceed those resulting from certain exemptions, then the NRC staff will address the applicable backfitting and issue finality provisions with respect to the added requirements as part of the rulemaking. Safety goal evaluations may be necessary to justify the proposed regulatory changes.

10 PEER REVIEW OF REGULATORY BASIS

The OMB's *Final Information Quality Bulletin for Peer Review* requires each Federal agency to subject "influential scientific information" to peer review prior to dissemination. The OMB defines "influential scientific information" as "scientific information the agency reasonably can determine will have or does have a clear and substantial impact on important public policies or private sector decisions." The regulatory basis does not contain "influential scientific information." Therefore, a peer review of the regulatory basis is not needed.

11 CONCLUSION

The NRC staff finds that there is sufficient regulatory basis to proceed with rulemaking. Specifically, the NRC staff has extensive experience with power reactor decommissioning, and recent experience has shown that multiple exemptions, license amendments, and other licensing actions are needed to establish a long-term regulatory framework for decommissioning power reactors. The power reactor decommissioning rulemaking may codify certain exemptions from regulatory requirements associated with EP, physical security requirements, DTFs, training requirements for CFHs for decommissioning reactors, record retention, LLW transportation, and onsite and offsite insurance for decommissioning power reactors. Therefore, this rulemaking would provide a predictable and stable set of regulations for future power reactor decommissioning, so as to avoid the need for the approval of exemptions, license amendments, and related licensing actions. In addition, per Commission direction in SRM-SECY-14-0118, the rulemaking may address other issues deemed relevant by the NRC staff, including cyber security, drug and alcohol testing, consideration of environmental impacts, minimum staffing, and the inclusion of spent fuel management planning information in decommissioning documents. At this time, the NRC is not recommending rulemaking for decommissioning power reactors in the areas of aging management and fatigue management.

In summary, this rulemaking would provide for an efficient decommissioning process; reduce the need for exemptions from existing regulations and license amendment requests; address other decommissioning issues deemed relevant by the NRC staff; and support the principles of good regulation, including openness, clarity, and reliability.

12 REFERENCES

Date	Document	ADAMS Accession No./*Federal Register* Citation
Main Document References		
1984	LBP-84-33, *Cincinnati Gas & Electric Company* (Wm. H. Zimmer Nuclear Power Station, Unit 1)	20 NRC 765
August 21, 1986	Commission's Safety Goal Policy Statement	51 FR 30028
June 27, 1988	Final Rule: General Requirements for Decommissioning Nuclear Facilities	53 FR 24018
April 1989	NUREG-1353, "Regulatory Analysis for the Resolution of Generic Issue 82, 'Beyond Design Basis Accidents in Spent Fuel Pools, '"	ML082330232
April 18, 1989	Final Rule: Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors	54 FR 15373, Page 15385-15386
February 3, 1994	Draft Policy Statement: Use of Decommissioning Trust Funds Before Decommissioning Plan Approval	59 FR 5216
July 20, 1995	Proposed Rule: Decommissioning of Nuclear Power Reactors	60 FR 37374
July 29, 1996	Final Rule: Decommissioning of Nuclear Power Reactors	61 FR 39278
December 21, 1999	Staff Requirements—SECY-99-168—Improving Decommissioning Regulations for Nuclear Power Plants	ML003752190
June 28, 2000	SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning"	ML003721626
February 2001	NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants"	ML010430066
June 4, 2001	SECY-01-0100, "Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools"	ML011450420
September 11, 2001	Letter, Issuance of Order for Interim Safeguards and Security Compensatory Measures.	ML020510637
August 16, 2002	Memorandum to Commission: Status of Regulatory Exemptions for Decommissioning Plants	ML030550706

Date	Document	ADAMS Accession No./*Federal Register* Citation
November 2002	NUREG-0586, Supplement 1, Volume 1, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors"	ML023470304 ML023470323
December 2004	NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors"	ML043510113
February 2005	RG 1.202, "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors"	ML050230008
December 2006	NEI-06-12, Revision 2, "B.5.b Phase 2 & 3 Submittal Guideline"	ML070090060
December 22, 2006	NRC Endorsement of NEI-06-12	ML063560235 (not publicly available)
May 19, 2008	Staff Requirements—SECY-08-0024—Delegation of Commission Authority to Staff to Approve or Deny Emergency Plan Changes That Represent a Decrease in Effectiveness	ML081400510
March 27, 2009	Final Rule: Power Reactor Security Requirements	74 FR 13926
February 4, 2010	Memorandum to Commission: Documentation of Evolution of Security Requirements at Commercial Nuclear Power Plants with Respect to Mitigation Measures for Large Fires and Explosions	ML092990438
January 7, 2011	Permanent Cessation of Operations at Oyster Creek Nuclear Generating Station	ML110070507
December 2011	NUREG-0933, "Resolution of Generic Safety Issues"	ML11353A382
March 12, 2012	Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events"	ML12054A735
March 12, 2012	Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation"	ML12056A044
June 2013	Regulatory Guide 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report"	ML13140A038

Date	Document	ADAMS Accession No./*Federal Register* Citation
June 6, 2013	Order EA-13-109, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions"	ML13143A321
September 24, 2013	Exemption: Maine Yankee Atomic Power Company, Connecticut Yankee Atomic Power Company, and The Yankee Atomic Electric Company	78 FR 58571
November 25, 2013	COMSECY-13-0030, "Staff Evaluation on Recommendation for Japan Lessons-Learned Tier 3 Issue on Expedited Transfer of Spent Fuel"	ML13329A918
May 23, 2014	Staff Requirements—COMSECY-13-0030, "Staff Evaluation on Recommendation for Japan Lessons-Learned Tier 3 Issue on Expedited Transfer of Spent Fuel"	ML14143A360
September 2014	NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor"	ML14255A365
October 29, 2014	SECY-14-0118, "Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements"	ML14219A444
November 14, 2014	Information Notice 2014-14, "Potential Safety Enhancements to Spent Fuel Pool Storage"	ML14218A493
December 30, 2014	Staff Requirements—SECY-14-0118—Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements	ML14364A111
January 30, 2015	SECY-15-0014, "Anticipated Schedule and Estimated Resources for a Power Reactor Decommissioning Rulemaking"	ML15082A089
October 7, 2015	SECY-15-0127, "Schedule, Resource Estimates, and Impacts for the Power Reactor Decommissioning Rulemaking"	ML15211A095 (not publicly available)
November 10, 2015	Notification of Permanent Cessation of Power Operations (for Pilgrim Nuclear Power Station)	ML15328A053
November 19, 2015	Advance Notice of Proposed Rulemaking: Regulatory Improvements for Decommissioning Power Reactors	80 FR 72358

Date	Document	ADAMS Accession No./*Federal Register* Citation
January 5, 2016	Summary: Public Meeting to Discuss Regulatory Improvements for Decommissioning Power Reactors: Advance Notice of Proposed Rulemaking	ML15362A099
March 16, 2016	Certification of Permanent Cessation of Power Operations (for James A. FitzPatrick Nuclear Power Plant)	ML16076A391
June 20, 2016	Certification of Permanent Cessation of Power Operations (for Clinton Power Station, Unit 1)	ML16172A137
June 20, 2016	Certification of Permanent Cessation of Power Operations (for Quad Cities Nuclear Power Station, Units 1 and 2)	ML16172A151
June 21, 2016	Request to Suspend NRC Review of Diablo Canyon Power Plant License Renewal	ML16173A454
June 24, 2016	Certification of Permanent Cessation of Power Operations (for Fort Calhoun Station, Unit 1)	ML16176A213
August 19, 2016	Public Comments on the Advance Notice of Proposed Rulemaking: Regulatory Improvements for Decommissioning Power Reactors	ML16229A277
October 2016	Power Reactor Transition from Operations to Decommissioning: Lessons Learned Report	ML16085A029
December 14, 2016	Quad Cities, Units 1 and 2 - Withdrawal of Certification of Permanent Cessation of Power Operations and Previously Submitted Licensing Actions in Support of Decommissioning	ML16349A311
December 14, 2016	Clinton, Unit 1 - Withdrawal of Certification of Permanent Cessation of Power Operations and Previously Submitted Licensing Actions in Support of Decommissioning	ML16349A314
January 4, 2017	James A. FitzPatrick Nuclear Power Plant - Withdrawal of Certification of Permanent Cessation of Power Operations	ML17012A280
January 4, 2017	Palisades Nuclear Plant - Certification of Permanent Cessation of Power Operations	ML17004A062
February 8, 2017	Indian Point Nuclear Generating Station, Units 2 & 3 - Notification of Permanent Cessation of Power Operations	ML17044A004

Date	Document	ADAMS Accession No./*Federal Register* Citation
March 15, 2017	Draft Regulatory Basis: Regulatory Improvements for Power Reactors Transitioning to Decommissioning	82 FR 13778
May 9, 2017	Draft Regulatory Analysis, "Regulatory Improvements for Power Reactors Transitioning to Decommissioning"	82 FR 21481
June 20, 2017	Three Mile Island, Unit 1 - Certification of Permanent Cessation of Power Operations	ML17171A151
September 28, 2017	Palisades Nuclear Plant - Certification of Permanent Cessation of Power Operations	ML17271A233
Appendix A, "Emergency Preparedness"		
June 12, 1961	*Power Reactor Development Co. v. International Union of Electrical, Radio and Machine Workers, AFL-CIO*	367 U.S. 396
March 16, 1970	*Crowther v. Seaborg*	312 F.Supp. 1205 (D. Colo. 1970)
December 22, 1975	*Citizens for Safe Power, Inc., and Audubon Naturalist Council, Petitioners, v. Nuclear Regulatory Commission, Respondent, Maine Yankee Atomic Power Company, Intervenor*	524 F.2d 1291 (D.C. Cir. 1975)
December 1978	NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants"	ML051390356
October 23, 1979	Policy Statement: Planning Basis for Emergency Responses to Nuclear Power Plant Accidents	44 FR 61123
November 1980	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"	ML040420012
July 13, 1982	Final Rule: Emergency Planning and Preparedness	47 FR 30232
February 1981	NUREG-0696, "Functional Criteria for Emergency Response Facilities"	ML051390358
1983	Southern California Edison Co. (San Onofre Nuclear Generating Station, Units 2 and 3)	ALAB-717, 17 NRC 346, 380
May 1992	EPA 400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents"	link

Date	Document	ADAMS Accession No./*Federal Register* Citation
June 22, 1995	Final Rule: Emergency Planning Licensing Requirements for Independent Spent Fuel Storage Facilities (ISFSI) and Monitored Retrievable Storage Facilities (MRS)	60 FR 32430
August 1997	NUREG/CR-6451, "A Safety and Regulatory Assessment of Generic BWR and PWR Permanently Shutdown Nuclear Power Plants"	ML082260098
March 29, 1999	Final Rule: Frequency of Reviews and Audits for Emergency Preparedness Programs, Safeguards Contingency Plans, and Security Programs for Nuclear Power Reactors	64 FR 14814
November 2002	NUREG-0586, Supplement 1, Volume 1, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors"	ML023470304
January 2005	NUREG/CR-6864, Volume 1, "Identification and Analysis of Factors Affecting Emergency Evacuations"	ML050250245
November 2010	FEMA Comprehensive Preparedness Guide 101, Version 2.0, "Developing and Maintaining Emergency Operations Plans"	link
April 19, 2011	Regulatory Issue Summary 2005-02, Revision 1, "Clarifying the Process for Making Emergency Plan Changes"	ML100340545
November 2011	RG 1.219, "Guidance on Making Changes to Emergency Plans for Nuclear Power Reactors"	ML102510626
November 2011	NSIR/DPR-ISG-01, "Interim Staff Guidance: Emergency Planning for Nuclear Power Plants"	ML113010523
November 23, 2011	Final Rule: Enhancements to Emergency Preparedness Regulations	76 FR 72560
November 2012	NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors"	ML12326A805
January 2013	NUREG-1022, Revision 3, "Event Reporting Guidelines 10 CFR 50.72 and 50.73"	ML13032A220

Date	Document	ADAMS Accession No./*Federal Register* Citation
March 28, 2013	U.S. Nuclear Regulatory Commission Review and Endorsement of NEI 99-01, Revision 6, Dated November, 2012 (TAC No. D92368)	ML12346A463
July 31, 2013	Kewaunee Power Station Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR Part 50, Appendix E	ML13221A182
September 26, 2013	Crystal River Unit 3—License Amendment Request #315, Revision 0, Permanently Defueled Emergency Plan and Emergency Action Level Scheme, and Request for Exemption to Certain Radiological Emergency Response Plan Requirements Defined by 10 CFR Part 50	ML13274A584
October 2013	RG 1.184, Revision 1, "Decommissioning of Nuclear Power Reactors"	ML13144A840
February 7, 2014	Notice of Public Meeting between the U.S. Nuclear Regulatory Commission Staff, the Nuclear Energy Institute and Industry to Discuss Interim Staff Guidance NSIR/DPR-ISG-02, "Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants"	ML14030A446
March 14, 2014	Vermont Yankee Nuclear Power Station Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR Part 50, Appendix E	ML14080A141
March 31, 2014	Emergency Planning Exemption Request, San Onofre Nuclear Generating Station, Units 1, 2, and 3 and Independent Spent Fuel Storage Installation	ML14092A332
April 28, 2014	Summary of Public Meeting between the U.S. Nuclear Regulatory Commission, the Nuclear Energy Institute, and Industry on Power Reactor Decommissioning Transition Issues	ML14106A242
June 10, 2014	Summary of May 22, 2014, Public Meeting between the U.S. Nuclear Regulatory Commission, the Nuclear Energy Institute, and Industry to Discuss Generic Emergency Plan-Related Decommissioning Transition Issues	ML14160A789

Date	Document	ADAMS Accession No./*Federal Register* Citation
June 27, 2014	SECY-14-0066, "Request by Dominion Energy Kewaunee, Inc. for Exemptions from Certain Emergency Planning Requirements"	ML14072A257
September 4, 2014	Inspection Procedure 82501, "Decommissioning Emergency Preparedness Program Evaluation"	ML14078A540
September 4, 2014	Inspection Procedure 82401, "Decommissioning Emergency Preparedness Scenario Review and Exercise Evaluation"	ML14078A529
October 27, 2014	Kewaunee Power Station—Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation (TAC No. MN2567)	ML14261A223
October 29, 2014	SECY-14-0118, "Request by Duke Energy Florida, Inc. for Exemptions from Certain Emergency Planning Requirements"	ML14219A444
November 4, 2014	Summary of Public Meeting between the U.S. Nuclear Regulatory Commission, the Nuclear Energy Institute, and Industry on Generic Emergency Plan-Related Decommissioning Transition Issues	ML14304A373
December 17, 2014	SECY-14-0144, "Request by Southern California Edison for Exemptions from Certain Emergency Planning Requirements"	ML14251A554
March 30, 2015	Crystal River Unit 3—Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation (TAC No. MF2981)	ML15058A906
May 2015	NUREG-0654/FEMA-REP-1, Revision 2, Draft, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"	ML14246A519
May 11, 2015	NSIR/DPR-ISG-02, "Interim Staff Guidance: Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants"	ML14106A057

Date	Document	ADAMS Accession No./*Federal Register* Citation
June 4, 2015	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 (TAC Nos. MF3835, MF3836, and MF3837)	ML15082A204
December 10, 2015	Vermont Yankee Nuclear Power Station—Exemptions from Certain Emergency Planning Requirements and Related Safety Evaluation (CAC No. MF3614)	ML15180A054
March 10, 2016	NRC 2016 Regulatory Information Conference, Technical Session: Reactor Decommissioning Rulemaking: Path to Regulatory Transparency	link
March 15, 2016	Briefing on Power Reactor Decommissioning Rulemaking	ML16078A034
April 2016	NUREG/CR-7215, "Spent Fuel Pool Project Phase I: Pre-Ignition and Ignition Testing of a Single Commercial 17x17 Pressurized Water Reactor Spent Fuel Assembly under Complete Loss of Coolant Accident Conditions"	ML16112A022
April 2016	NUREG/CR-7216, "Spent Fuel Pool Project Phase II: Pre-Ignition and Ignition Testing of a 1x4 Commercial 17x17 Pressurized Water Reactor Spent Fuel Assemblies under Complete Loss of Coolant Accident Conditions"	ML16112A084
May 31, 2016	Transmittal of Reports to Inform Decommissioning Plant Rulemaking for User Need Request NSIR-2015-001 • Task 1 Report, "A Human Reliability Analysis of the Safety of the Spent Fuel in the Spent Fuel Pool of Decommissioning Nuclear Plants" • Task 2 Report, "Spent Fuel Assembly Heat Up Calculations in Support of Task 2 of User Need NSIR-2015-001" Task 3 Report 3, "Offsite Dose Accumulation Rates Following a Hypothetical Spent Fuel Pool Accident"	ML16110A416
	NRC Form 361 (Edition 12-2000), "Reactor Plant Event Notification Worksheet"	link

Date	Document	ADAMS Accession No./*Federal Register* Citation
Appendix B, "Physical Security"		
May 1980	RG 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"	ML003739976
August 1983	NUREG/CR-3330, "Vulnerability of Nuclear Power Plant Structures to Large External Fires"	ML062260290
August 1994	RG 5.68, "Protection against Malevolent Use of Vehicles at Nuclear Power Plants"	ML003739379
July 1998	NUREG-1619, "Standard Review Plan for Physical Protection Plans for the Independent Storage of Spent Fuel and High-Level Radioactive Waste"	ML020720453
June 2000	NUREG-1628, "Staff Responses to Frequently Asked Questions Concerning Decommissioning of Nuclear Power Plants"	ML003726190
February 25, 2002	Order EA-02-026, "Interim Safeguards and Security Compensatory Measures"	ML021350569
March 27, 2009	Final Rule: Power Reactor Security Requirements (RIN: 3150-AG63)	74 FR 13926
July 2009	RG 5.75, "Training and Qualification of Security Personnel at Nuclear Power Reactor Facilities"	ML091690037
October 9, 2013	SECY-13-0112, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark 1 Boiling-Water Reactor"	ML13256A339
April 23, 2014	COMSECY-14-0015, "Security Inspections at U.S. Nuclear Regulatory Commission Decommissioning Power Reactors"	ML13347B178
May 28, 2014	Staff Requirements—COMSECY-14-0015—Security Inspections at U.S. Nuclear Regulatory Commission Decommissioning Power Reactors	ML14148A010
September 28, 2015	NSIR/DSP-ISG-03, "Interim Staff Guidance: Review of Security Exemptions/License Amendment Requests for Decommissioning Nuclear Power Plants"	ML15106A737
Appendix C, "Cyber Security"		
October 26, 2006	Proposed Rule: Power Reactor Security Requirements	71 FR 62663
January 2010	RG 5.71, "Cyber Security Programs for Nuclear Facilities"	ML090340159

Date	Document	ADAMS Accession No./*Federal Register* Citation
April 2010	NEI 08-09, Revision 6, "Cyber Security Plan for Nuclear Power Reactors"	ML101180437
June 25, 2012	SECY-12-0088, "The Nuclear Regulatory Commission Cyber Security Roadmap"	ML12135A050
October 1, 2015	San Onofre Nuclear Generating Station, Units 2 and 3—Issuance of Amendments to Revise the Cyber Security Plan Milestone 8 Completion Date in the Facility Operating Licenses (TAC Nos. MF5191 and MF5192)	ML15209A935
October 15, 2015	Request for Approval of the Kewaunee Power Station Security Plan	ML15294A072
November 2015	NEI 13-10, Revision 4, "Cyber Security Control Assessments"	ML15338A276
June 16, 2016	Proposed Changes to Cyber Security Plan Implementation Schedule Completion Date, San Onofre Nuclear Generating Station, Units 2 and 3	ML16172A075
Appendix D, "Drug and Alcohol Testing"		
June 1991	RG 5.66, "Access Authorization Program for Nuclear Power Plants"	ML003739354
August 18, 2004	Order EA-03-099, "Issuance of Order for Implementation of Additional Security Measures Associated with Access Authorization, Fitness for Duty and Behavior Observation"	ML042250002
March 31, 2008	Final Rule: Fitness for Duty Programs	73 FR 16966
March 2009	RG 5.77, "Insider Mitigation Program"	ML15219A609
September 3, 2014	Summary of Fitness for Duty Program Performance Reports for Calendar Year 2013	ML14246A440
Appendix E, "Certified Fuel Handlers"		
May 12, 2014	Kewaunee Power Station—Approval of Shift Manager/Certified Fuel Handler Training Program (TAC No. MF2370)	ML14104A046
August 1, 2014	San Onofre Nuclear Generating Station, Units 2 and 3—Approval of Safe Storage Shift Manager/Certified Fuel Handler Training Program (TAC Nos. MF2601 and MF2602)	ML13268A165
Appendix F, "Decommissioning Trust Funds"		
August 1990	RG 1.159, Revision 0, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors"	ML003740066

Date	Document	ADAMS Accession No./*Federal Register* Citation
May 16, 2002	SECY-02-0085, "Recent Issues with Respect to Decommissioning Funding Assurance That Have Arisen as Part of License Transfer Applications and Other Licensing Requests"	ML013550423
December 24, 2002	Final Rule: Decommissioning Trust Provisions	67 FR 78332
January 3, 2003	Staff Requirements—SECY-02-0085—Recent Issues with Respect to Decommissioning Funding Assurance That Have Arisen as Part of License Transfer Applications and Other Licensing Requests	ML030030539
October 2003	RG 1.159, Revision 1, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors"	ML032790365
January 8, 2009	Regulatory Issue Summary 2001-07, Revision 1, "10 CFR 50.75 Reporting and Recordkeeping for Decommissioning Planning"	ML083440158
October 26, 2011	SECY-11-0149, "Summary Findings Resulting from the Staff Review of the 2010 Decommissioning Funding Status Reports for Operating Power Reactor Licensees"	ML112800468
January 2013	NUREG-1307, Revision 15, "Report on Waste Burial Charges: Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities"	ML13023A030
June 20, 2013	SECY-13-0066, "Staff Findings on the Table of Minimum Amounts Required to Demonstrate Decommissioning Funding Assurance"	ML13127A234
Appendix G, "Offsite and Onsite Financial Protection Requirements and Indemnity Agreements"		
September 2, 1957	Price-Anderson Nuclear Industries Indemnity Act	71 Stat. 576
April 1989	NUREG-1353, "Regulatory Analysis for the Resolution of Generic Issue 82, 'Beyond Design Basis Accidents in Spent Fuel Pools'"	ML082330232
December 1990	NUREG-1150, Volume 1, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants"	ML120960691
May 10, 1993	SECY-93-127, "Financial Protection Required of Licensees of Large Nuclear Power Plants during Decommissioning"	ML12257A628

Date	Document	ADAMS Accession No./*Federal Register* Citation
July 13, 1993	Staff Requirements–SECY-93-127—Financial Protection Required of Licensees of Large Nuclear Power Plants during Decommissioning	ML003760936
December 17, 1996	SECY-96-256, "Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11"	ML15062A483
January 28, 1997	Staff Requirements—SECY-96-256—Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11	ML15062A454
August 13, 1997	SECY-97-186, "Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11"	ML992930019
October 6, 1997	Staff Requirements—SECY-97-186—Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11	ML003753155
October 30, 1997	Proposed Rule: Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors	62 FR 58690
August 16, 2002	Memorandum to Commission, "Status of Regulatory Exemptions for Decommissioning Plants"	ML030550706
September 29, 2004	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"	ML040850518
October 29, 2004	Staff Requirements—SECY-04-0176—Exemption Request to Reduce Liability Insurance Coverage for Decommissioning Reactors after Transfer of All Spent Fuel from a Spent Fuel Pool to Dry Cask Storage	ML043030459
November 2012	NUREG-1935, "State-of-the-Art Reactor Consequence Analyses (SOARCA) Report"	ML12332A057

Date	Document	ADAMS Accession No./*Federal Register* Citation
March 16, 2015	Kewaunee Power Station—Exemption from the Requirements of Title 10 of the *Code of Federal Regulations*, Part 140, Section 140.11(a)(4) Concerning Primary and Secondary Liability Insurance (TAC No. MF3916)	ML15026A522
April 3, 2015	Kewaunee Power Station—Exemption from the Requirements of Title 10 of the *Code of Federal Regulations*, Part 50, Section 50.54(w)(1) Concerning Insurance for Post-Accident Site Decontamination (TAC No. MF3915)	ML15033A245
April 27, 2015	Crystal River Unit 3 Nuclear Generating Plant—Exemption from the Requirements of Title 10 of the *Code Of Federal Regulations*, Part 140, Section 140.11(a)(4) Concerning Primary and Secondary Liability Insurance (TAC No. MF3588)	ML14183B338
September 16, 2015	Request for Exemption from 10 CFR 140.11 (a)(11), San Onofre Nuclear Generating Station Units 1, 2, and 3	ML15260B188
October 22, 2015	Request for Exemption from 10 CFR 50.54(w)(1), San Onofre Nuclear Generating Station Units 1, 2, and 3	ML15299A220
March 16, 2016	Crystal River Unit 3 Nuclear Generating Plant—Exemption from the Requirements of Title 10 of the *Code of Federal Regulations*, Section 50.54(w)(1) Concerning Insurance for Post-Accident Site Decontamination (TAC No. L53108)	ML16020A432
April 15, 2016	Vermont Yankee Nuclear Power Station—Exemption from the Requirements of Title 10 of the *Code of Federal Regulations*, Part 140, Section 140.11(a)(4), Concerning Primary and Secondary Liability Insurance (CAC No. MF3980)	ML16012A144

Date	Document	ADAMS Accession No./*Federal Register* Citation
April 15, 2016	Vermont Yankee Nuclear Power Station—Exemption from the Requirements of Title 10 of the *Code of Federal Regulations*, Part 50, Section 50.54(w)(1) Concerning Insurance for Post-Accident Site Decontamination (CAC No. MF3981)	ML16012A193
Appendix H, "Current Regulatory Approach to Decommissioning"		
June 1978, Addendum 1, August 1979, Addendum 2, July 1983, Addendum 3, September 1984, Addendum 4	R.I. Smith, G.J. Konzek, and W.E. Kennedy, Jr., "Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station," NUREG/CR-0130, prepared by Pacific Northwest Laboratory for the NRC	link
June 1980, Addendum 1, July 1983, Addendum 2, September 1984, and Addendum 3	H.D. Oak, G.M. Holter, W.E. Kennedy, Jr., and G.J. Konzek, "Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station," NUREG/CR-0672, prepared by Pacific Northwest Laboratory for the NRC	link
August 1988	Excerpted Sections Relating to Power Reactors, NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities"	link
June 1997	NUREG-1496, Volume 1, "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination on NRC-Licensed Nuclear Facilities"	ML042310492
July 1997	NUREG-1496, Volume 1, "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities"	ML042310492
September 2000	NUREG-1727, "NMSS Decommissioning Standard Review Plan"	ML003761169
November 2002	NUREG-0586, Supplement 1, Volume 1, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors"	ML023470304

Date	Document	ADAMS Accession No./*Federal Register* Citation
April 2003	NUREG-1700, Revision 1, "Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans"	ML031270391
September 2006	NUREG-1757, "Consolidated Decommissioning Guidance," Volume 1, Revision 2, "Decommissioning Process for Materials Licensees"	ML063000243
June 2008	RG 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning"	ML080500187
December 2012	RG 4.22, "Decommissioning Planning during Operations"	ML12158A361
April 2013	Inspection Manual Chapter (IMC) 2561, "Decommissioning Power Reactor Inspection Program"	ML031270502
June 2013	RG 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report"	ML13140A038
June 2013	NUREG-1437, Volume 1, Revision 1, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants"	ML13106A241
June 2013	NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants," Supplement 1, Revision 1, "Operating License Renewal"	ML13106A246
October 2013	RG 1.184, Revision 1, "Decommissioning of Nuclear Power Reactors"	ML13144A840
September 2014	NUREG-2157, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel"	ML14198A440
Appendix I, "Application of Backfit Rule"		
November 4, 1998	SECY-98-253, "Applicability of Plant-Specific Backfit Requirements to Plants Undergoing Decommissioning"	ADAMS Legacy No. 9806110221
February 12, 1999	Staff Requiremetns–SECY-98-253—Applicability of Plant-Specific Backfit Requirements to Plants Undergoing Decommissioning	ML12311A689
October 9, 2013	Management Directive 8.4, "Management of Facility-Specific Backfitting and Information Collection"	ML12059A460
Appendix J, "Aging Management"		

Date	Document	ADAMS Accession No./*Federal Register* Citation
May 8, 1995	Final Rule: Nuclear Power Plant License Renewal; Revisions	60 FR 22461
July 1999	NEI 99-04, "Guidelines for Managing NRC Commitment Changes"	ML003680088
November 24, 2014	Reissuance of Dominion Nuclear Connecticut, Inc., Millstone Power Station Unit 1—NRC Inspection Report No. 05000245/2014010	ML14328A190
October 7, 2015	Vermont Yankee Nuclear Power Station—Issuance of Amendment for Defueled Technical Specifications and Revised License Conditions for Permanently Defueled Condition (CAC No. MF3714)	ML15117A551
Appendix K, "Fatigue Management"		
February 18, 1982	Policy Statement: Nuclear Power Plant Staff Working Hours	47 FR 7352
June 15, 1982	Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours"	link
June 7, 1989	Final Rule: Fitness-for-Duty Programs	54 FR 24468
July 18, 1988	SRM-SECY-88-129, "Proposed Rulemaking Fitness for Duty Programs"	ML010930151
June 22, 2001	SECY-01-0113, "Fatigue of Workers at Nuclear Power Plants"	ML010180188
January 8, 2002	Staff Requirements—SECY-01-0113—Fatigue of Workers at Nuclear Power Plants	ML020080309
April 29, 2003	Order EA-03-038, "Issuance of Order for Compensatory Measures Related to Fitness-for-Duty Enhancements Applicable to Nuclear Facility Security Force Personnel"	ML030940198
September 1, 2004	Staff Requirements—COMSECY-04-0037—Fitness-for-Duty Orders to Address Fatigue of Nuclear Facility Security Force Personnel	ML042450533
March 2009	RG 5.73, "Fatigue Management for Nuclear Power Plant Personnel"	ML083450028
October 2008	NEI 06-11, Revision 1, "Managing Personnel Fatigue at Nuclear Power Reactor Sites"	ML090360158
September 3, 2010	Petition to Amend 10 CFR Part 26, "Fitness-for-Duty Programs"	ML102590440
October 22, 2010	Anthony R. Pietrangelo on Behalf of the Nuclear Energy Institute; Receipt of Petition for Rulemaking	75 FR 65249

Date	Document	ADAMS Accession No./*Federal Register* Citation
December 13, 2010	Summary of Public Meeting to Discuss Part 26, Subpart I Implementation to Understand Unintended Consequences of the Minimum Day Off Requirements	ML103430557
January 14, 2011	Notice of Public Meeting to Discuss Alternatives to the Part 26, Subpart I, Minimum Day Off Requirements	ML110140315
February 3, 2011	Summary of Public Meeting Regarding Part 26, Subpart I Minimum Day Off Requirements and Options Licensees May Implement to Receive Enforcement Discretion from These Requirements	ML110280446
February 8, 2011	Commission Meeting—Briefing on Implementation of Part 26	
March 24, 2011	Staff Requirements—SECY-11-0003—Status of Enforcement Discretion Request and Rulemaking Activities Related to 10 CFR Part 26, Subpart I, "Managing Fatigue" and SECY-11-0028—Options for Implementing an Alternative Interim Regulatory Approach to the Minimum Days Off Provisions of 10 CFR Part 26, Subpart I, "Managing Fatigue"	ML110830971
April 26, 2011	Proposed Rule: Alternative to Minimum Days Off Requirements	76 FR 23208
July 21, 2011	Final Rule: Alternative to Minimum Days Off Requirements	76 FR 43534
November 3, 2015	NEI 15-08, Revision 0, "Managing Personnel Fatigue at Decommissioning Reactors"	ML15350A153

APPENDIX A
EMERGENCY PREPAREDNESS

CONTENTS

1 INTRODUCTION

The emergency preparedness (EP) requirements in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.47, "Emergency plans," and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," 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 address this, the U.S. Nuclear Regulatory Commission (NRC) is considering several changes to 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.

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 there are no applicable design-basis events at a decommissioning licensee's facility 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 (EPA 400-R-92-001, issued May 1992, and final revision EPA-400/R-17/001, issued January 2017).

The NRC also relied on analyses that showed that a beyond-design-basis zirconium fire in the spent fuel pool (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 (NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," issued February 2001 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML010430066)). Based on reasonably conservative adiabatic heatup calculations, a minimum of 10 hours for the time to heat up 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.

In four recent EP exemptions (issued in 2014 and 2015), 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 EP, including the requirement to maintain the 10-mile plume exposure pathway and the 50-mile ingestion pathway emergency planning zones (EPZs).

2 EXISTING REGULATORY FRAMEWORK

As an independent agency, the NRC's regulatory authority is established by certain enabling statutes. NRC authority to regulate the use of radioactive materials is set forth in the Atomic Energy Act of 1954, as amended (AEA), and Title II of the Energy Reorganization Act of 1974, as amended (ERA). Both the AEA and ERA confer broad regulatory powers to the Commission and specifically authorize it to promulgate regulations it deems necessary to fulfill its responsibilities under those statutes. Section 161b. of the AEA authorizes the Commission to establish by rule, regulation, or order such standards and instructions 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. Under Section 161i. of the AEA, the Commission may prescribe such regulations or orders as it may deem necessary to protect health and to minimize danger to life or property.

In 1980, the Commission promulgated a set of 16 planning standards in 10 CFR 50.47(b) that the onsite and offsite emergency plans for nuclear power reactor licensees must meet (Volume 45 of the *Federal Register* (FR), page 55402 (45 FR 55402); August 19, 1980). The 1980 EP final rule also revised Appendix E to 10 CFR Part 50 in order to clarify, expand, and upgrade the Commission's emergency planning regulations. Additional regulations governing EP for nuclear power reactors are set forth in 10 CFR 50.54(q), (s), and (t). 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[6] emergency response plans. The Commission, based on its authority under the AEA, determined that these standards are necessary for operating power reactors to provide for public health and safety.

The regulations in 10 CFR 50.47 and 10 CFR 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. The Federal Emergency Management Agency (FEMA) role in emergency planning for nuclear power plants is recognized in the NRC regulations cited above, FEMA regulations at 44 CFR Part 350, and a memorandum of understanding between the two agencies first established in 1980 and last updated in 2015 (ADAMS Accession No. ML15344A371).

Under 10 CFR 50.47(a)(1)(i), the NRC issues operating licenses after making a finding "that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency." The regulations in 10 CFR 50.47(a)(2) specify that the NRC will base its reasonable assurance finding on (1) the NRC's assessment of the adequacy of the applicant's onsite emergency plan and whether there is reasonable assurance the plan can be implemented, and (2) the NRC's review of the FEMA findings and determinations as to whether State and local emergency plans are adequate and whether there is reasonable assurance that they can be implemented.

[6] Federal Emergency Management Agency (FEMA) regulations at 44 CFR Part 350, "Review and Approval of State and Local Radiological Emergency Plans and Preparedness," reproduce the offsite standards.

2.1 Offsite Radiological Emergency Preparedness Program

The need for NRC findings and determinations regarding the adequacy of offsite emergency plans led to the development of FEMA's Radiological Emergency Preparedness (REP) Program. After publication of the 1980 EP final rule, FEMA established the REP Program to manage its responsibility in areas around nuclear power plants, to include providing findings and determinations to the NRC. FEMA provides its findings and determinations regarding the adequacy of offsite plans and whether they can be implemented to the NRC for consideration in the NRC's overall determination whether reasonable assurance exists that adequate protective measures can and will be taken in the event of a radiological emergency. Regulatory requirements for offsite radiological emergency planning and the REP Program are not synonymous. In carrying out its responsibility under the AEA, the Commission will establish regulatory standards for offsite radiological emergency planning when there is a need to make determinations that reasonable assurance exists regarding the adequacy of the offsite plans (in this context, "adequate" means that the plans meet the NRC's standards for such plans). In the case of EP regulations for research and test reactors, fuel cycle facilities, and independent spent fuel storage facilities (ISFSIs), there are no regulatory requirements for offsite radiological emergency plans. As such, FEMA findings and determinations are not needed to support NRC licensing decisions for such facilities.

The REP Program is a response to the regulatory standards for offsite radiological emergency planning established by the Commission. The program administers offsite EP for commercial nuclear sites, ensuring the adequacy of formal offsite radiological emergency planning. The NRC has concluded in its review of several EP exemption requests that formal offsite radiological emergency plans are not necessary for permanently shutdown and defueled nuclear power reactor licensees. This statement, "formal offsite radiological emergency plans," refers to the regulatory standards for such plans, and the findings and determinations regarding the adequacy of offsite plans obtained through a "formal" REP Program. Accordingly, the REP Program should not be equated to, or defined in terms of, offsite response capabilities, accident consequences, or risk, or by any other basis outside of its purpose in supporting the NRC's regulatory requirements. In the absence of regulatory requirements for offsite radiological emergency planning, the responsible offsite response organizations (OROs) would continue to take actions to protect public health and safety. These response actions are not unique to radiological hazards.

The response capabilities of State and local governments exist independent of the REP Program. Requirements for plans to cope with emergencies were first published in 10 CFR Part 50, Appendix E, in 1970 (35 FR 19567; December 24, 1970). These requirements were directed to applicants for licenses to operate production and utilization facilities, and plans were to include criteria for determining the need for notification and participation of local and State agencies as well as arrangements for local services in support of the onsite plan. Offsite authorities are necessarily responsible for the implementation of any protective actions off site. The legal authority and responsibility of local, State, and Federal governments for offsite response has always been recognized by the NRC, including in the publication of 10 CFR Part 50, Appendix E.

In November 1975, the NRC published Regulatory Guide (RG) 1.101, Revision 0, "Emergency Planning for Nuclear Power Plants," to provide more complete guidance for developing adequate emergency plans. RG 1.101 established the regulatory position that planning and implementation of emergency measures within the site boundary rests with the licensee, while planning and implementation of measures to cope with plant-related emergencies outside of the

site boundary should be a coordinated effort involving the licensee and local, county, State, and Federal agencies having emergency responsibilities. As described in RG 1.101, the licensee's emergency plan is required to describe this coordination—in particular, the arrangements and agreements between the licensee and these supporting agencies.

2.2 Applicability of Existing Regulatory Framework to Decommissioning Sites

The existing regulations and the planning basis for EP are based upon an anticipated prompt response to a wide spectrum of events relevant to an operating power reactor. No explicit regulatory provisions distinguish EP requirements for a power reactor that is permanently shutdown and defueled from those for an operating reactor. To establish a level of EP commensurate with the risk at a decommissioning site, licensees typically request exemptions from the regulatory EP requirements early in the decommissioning process and the NRC grants them on a case-by-case basis after a thorough review. Historically, given the significant reduction in radiological risk from a decommissioning site, the NRC has approved exemptions from EP requirements based on site-specific evaluations and the objectives of the regulations. For each of these exemption requests, the NRC staff verified the licensee's site-specific supporting analyses. Between 1987 and 1999, the NRC issued exemptions from EP requirements for 10 licensees. More recently, the agency has granted exemptions from EP requirements for Kewaunee Power Station; Crystal River Nuclear Generating Plant, Unit 3; San Onofre Nuclear Generating Station, Units 2 and 3; and Vermont Yankee Nuclear Power Station (ADAMS Accession Nos. ML14261A223, ML15058A906, ML15082A204, and ML15180A054, respectively).

3 TECHNICAL BASIS FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

The purpose of rulemaking in this regulatory area is to establish an appropriate level of emergency planning and preparedness for a nuclear power plant site at which all reactors have been permanently shut down and defueled. The sections below consider the technical basis for options to enhance the effectiveness and efficiency of the regulatory framework for both licensees and the NRC while providing assurance of public health and safety. The rulemaking option considered (i.e., Option 2 in Section 4) would define the level of EP appropriate for a decommissioning nuclear power plant site from the time of permanent cessation of operations and permanent removal of fuel from the reactor vessel, until such time as no EP would be required. This rulemaking would provide regulatory certainty and reduce the need for licensees to request, and the NRC to review, exemptions from regulations, and it would reduce the associated regulatory burden on the licensees and the NRC.

In preparing this technical basis, the NRC staff consulted a number of references, including the following:

- NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," issued December 1978 (ADAMS Accession No. ML051390356)

- EPA 400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," issued May 1992

- NUREG/CR-6451, “A Safety and Regulatory Assessment of Generic BWR [boiling water reactor] and PWR [pressurized water reactor] Permanently Shutdown Nuclear Power Plants,” issued August 1997 (ADAMS Accession No. ML082260098) (provides recommendations on operationally based regulations that could be partially or totally removed with respect to decommissioning power reactor licensees without impacting public health and safety)

- NUREG-1738, “Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants,” issued February 2001 (ADAMS Accession No. ML010430066)

- NUREG/CR-6864, “Identification and Analysis of Factors Affecting Emergency Evacuations,” issued January 2005 (ADAMS Accession Nos. ML050250245 and ML050250219)

- EA-12-049, “Order Modyfying Licenses with Regard to Requirements for Mitigation Strategies For Beyond-Design-Basis External Events,” dated March 12, 2012 (ADAMS Accession No. ML12054A735).

- EA-12-051, “Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,” dated March 12, 2012 (ADAMS Accession No. ML12056A044)

- “Kewaunee Power Station Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR 50, Appendix E,” dated July 31, 2013 (ADAMS Accession No. ML13221A182)

- “Crystal River Unit 3—License Amendment Request #315, Revision 0, Permanently Defueled Emergency Plan and Emergency Action Level Scheme, and Request for Exemption to Certain Radiological Emergency Response Plan Requirements Defined by 10 CFR 50,” dated September 26, 2013 (ADAMS Accession No. ML13274A584)

- stakeholder feedback from public meetings on EP exemption requests and NSIR/DPR-ISG-02 (i.e., meetings held on March 6, 2014 (ADAMS Accession No. ML14030A446), April 3, 2014 (ADAMS Accession No. ML14106A242), May 22, 2014 (ADAMS Accession No. ML14160A789), and November 13, 2014 (ADAMS Accession No. ML14304A373))

- “Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR 50, Appendix E, Vermont Yankee Nuclear Power Station,” dated March 14, 2014 (ADAMS Accession No. ML14080A141)

- “Emergency Planning Exemption Request, San Onofre Nuclear Generating Station, Units 1, 2, and 3 and Independent Spent Fuel Storage Installation,” dated March 31, 2014 (ADAMS Accession No. ML14092A332)

- SECY-14-0066, “Request by Dominion Energy Kewaunee, Inc. for Exemptions from Certain Emergency Planning Requirements,” dated June 27, 2014 (ADAMS Accession No. ML14072A257)

- 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) (finds that a radiological release is not expected to occur at the operating power reactor site studied for at least 72 hours following a

postulated beyond-design-basis seismic event occurring more than 60 days after shutdown)

- SECY-14-0118, “Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements,” dated October 29, 2014 (ADAMS Accession No. ML14219A444)

- SECY-14-0125, “Request by Entergy Nuclear Operations, Inc., for Exemptions from Certain Emergency Planning Requirements,” dated November 14, 2014 (ADAMS Accession No. ML14227A711)

- SECY-14-0144, “Request by Southern California Edison for Exemptions from Certain Emergency Planning Requirements,” dated December 17, 2014 (ADAMS Accession No. ML14251A554)

- NSIR/DPR-ISG-02, “Interim Staff Guidance, Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants,” dated May 11, 2015 (ADAMS Accession No. ML14106A057) (provides guidance to the NRC staff on conducting the technical review of requests for exemptions from EP requirements for nuclear power reactors that have been permanently shut down and defueled or are planning to transition to a decommissioning state)

- NUREG/CR-7215, “Spent Fuel Pool Project Phase I: Pre-Ignition and Ignition Testing of a Single Commercial 17x17 Pressurized Water Reactor Spent Fuel Assembly under Complete Loss of Coolant Accident Conditions,” issued April 2016 (ADAMS Accession No. ML16112A022)

- NUREG/CR-7216, “Spent Fuel Pool Project Phase II: Pre-Ignition and Ignition Testing of a 1x4 Commercial 17x17 Pressurized Water Reactor Spent Fuel Assemblies under Complete Loss of Coolant Accident Conditions,” issued April 2016 (ADAMS Accession No. ML16112A084)

- Memorandum to B. Holian from M. Weber, “Transmittal of Reports to Inform Decommissioning Plant Rulemaking for User Need Request NSIR-2015-001,” dated May 31, 2016 (ADAMS Accession No. ML16110A416)

  – Task 1 Report, “A Human Reliability Analysis of the Safety of the Spent Fuel in the Spent Fuel Pool of Decommissioning Nuclear Plants”

  – Task 2 Report, “Spent Fuel Assembly Heat Up Calculations in Support of Task 2 of User Need NSIR-2015-001”

  – Task 3 Report, “Offsite Dose Accumulation Rates Following a Hypothetical Spent Fuel Pool Accident”

- SECY-16-0142, “Draft Final Rule—Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49,” dated December 15, 2016 (ADAMS Accession No. ML16301A005)

- EPA-400/R-17/001, “PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents,” issued January 2017

- public comments on the advance notice of proposed rulemaking for the power reactor decommissioning rulemaking (ADAMS Accession No. ML16229A277)

4 RULEMAKING OPTIONS

4.1 Option 1: No Action

4.1.1 Description of Option 1

This option would maintain the current EP regulations in effect. The NRC would continue to grant relief from regulatory requirements during decommissioning on a case-by-case basis through the exemption process.

4.1.2 Assessment of Option 1

The "no-action" option would retain the current EP provisions in 10 CFR Part 50. Because certain EP requirements designed for operating reactors impose regulatory burden on licensees undergoing decommissioning that is not necessary to protect public health and safety, licensees generally request exemptions from these requirements. Under the current exemption process (NSIR/DPR-ISG-02), exemptions from 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. Despite both generic analyses and site-specific regulatory experience that supports the appropriateness of this 10-hour timeframe, as described for Option 2 in Section 4.2, this option would continue to require site-specific analysis by the licensee and review by the NRC for each application. Option 1 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 Option 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. RG 1.184, Revision 1, "Decommissioning of Nuclear Power Reactors," issued October 2013, 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.

4.2 Option 2: Graded Approach to Emergency Preparedness

4.2.1 Description of Option 2

In this option, the NRC would pursue rulemaking to propose a graded approach to EP that is commensurate with the reductions in radiological risk at four stages (or 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 fuel to dry storage, and (4) removal of all fuel from the site. Many commenters expressed support for a risk-informed graded approach to EP. Conversely, some commenters opposed any revisions or reductions in EP requirements or expressed concerns that the NRC's proposal would reduce the level of offsite radiological EP at decommissioning facilities.

A graded approach to EP has a longstanding regulatory history. The 16 EP planning standards for operating reactors, outlined in 10 CFR 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 wider continuum of radiological planning standards for EP. The EP regulations for research and test reactors, fuel cycle facilities, and ISFSIs, and the EP considerations for small modular reactors and other new technologies (ADAMS Accession No. ML16309A332), 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.

4.2.2 Background on the Planning Basis

The preparation of adequate radiological emergency response plans requires basic information on an accident, such as the timing of a potential release, characteristics of the radioactive material, and the extent of the area potentially impacted. As a result of some perceived confusion in how accident analyses should relate to emergency planning, the Conference of (State) Radiation Control Program Directors passed a resolution in 1976 asking the NRC to "make a determination of the most severe accident basis for which radiological emergency response plans should be developed by offsite agencies," as discussed in Section I, "Introduction" of NUREG-0396. In November 1976, a task force consisting of NRC and EPA representatives was assembled to address this request and related issues. The task force interpreted the request as a charge to provide a clearer definition of the types of radiological accidents for which States and local governments should plan and develop preparedness programs.

In 1978, an NRC and EPA task force established the planning basis for EP for nuclear power accidents in NUREG-0396. 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. With this spectrum of accidents, the task force established the scope of the planning effort 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 radioactive materials that can be potentially released to the environment:

(1) Distance

NUREG-0396 introduced the concept of the EPZ, stating that the recommended EPZ should be "of sufficient size to provide dose savings to the population in areas where the projected dose from design basis accidents could be expected to exceed the applicable PAGs under unfavorable atmospheric conditions." The report clarified that the objective of emergency response plans is not to prevent doses above EPA PAG levels but to provide dose savings for a spectrum of accidents that could produce offsite doses in excess of the PAGs. In developing the technical basis for decommissioning facilities, the NRC staff considered the need for predetermined protective actions in the extent of the offsite planning efforts.

(2) Time Dependency

NUREG-0396 explained that the time between the initial recognition at the nuclear facility that a serious accident is in progress and the beginning of the radioactive release to the surrounding environment is critical in determining the type of protective actions that are feasible. Consideration should be given to the possible time periods between the initiating event and arrival of the plume and possible time periods of releases in relationship to the time needed to implement protective actions. For large light-water reactors, the time between initiating event and release was assumed to be as short as 30 minutes.

(3) Characteristics of Radioactive Materials

NUREG-0396 explained that knowledge of the kinds of radioactive materials potentially released is necessary to decide the characteristics of monitoring instrumentation, to develop tools for estimating projected doses, and to identify the most important exposure pathways. The guidance concludes that emergency plans should focus on the release of gaseous materials and volatile solids, such as noble gases and iodine, respectively, because the potential for releases to the environment decreased dramatically when progressing from gaseous materials to volatile solids to nonvolatile solids.

The rationale in NUREG-0396 and the planning basis elements can also be applied to light-water reactors after permanent cessation of operations and permanent removal of fuel from the reactor vessel to scope the planning effort. The sections below describe how the NRC staff applied this same 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.

4.2.3 Consideration of a Spectrum of Accident Consequences

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 selection 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 physically possible accident regardless of its extremely low likelihood. As previously discussed, the NRC has granted exemptions to EP requirements based on site-specific analyses demonstrating quantified reductions in radiological risk. The risk of a significant radiological release off site at a decommissioning facility storing irradiated fuel in the SFP is lower than the risk from an operating power reactor and associated SFP. This conclusion is based on the consideration of initiating reactor events associated with normal and abnormal operations, design-basis accidents (DBAs), and certain beyond-design-basis events applicable to a decommissioning site. In NUREG-1738, the NRC staff 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. In NUREG-1738, the NRC stated, “for comparison, at operating reactors additional risk-significant accidents for which EP is expected to provide dose savings are on the order of $1x10^{-5}$ per year, while for decommissioning facilities, the largest contributor for which EP would provide dose savings is about two orders of magnitude lower (cask drop sequence at $2x10^{-7}$ per year).” The

NUREG-1738 study found that the risk at decommissioning plants is low and well within the Commission's safety goals.

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 and fuel damage. 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 from NUREG-0396, the NRC considered the potential impacts of a zirconium fire and how mitigating strategies put in place to prevent beyond-design-basis accidents would also apply to this highly unlikely event.

4.2.4 Consideration of Planning Elements

With this understanding of the spectrum of accident consequences at decommissioning reactors, the NRC staff next considered the 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 radioactive materials that can be potentially released to the environment.

Shortly after the operating power reactor EP regulations were established and implemented in 1980, the NRC amended its regulations to clarify EP requirements for issuing a "low-power license" (the Low-Power Rule (47 FR 30232; July 13, 1982)). At that time, the Commission did not differentiate which EP requirements would be applicable during the period of fuel loading and low-power testing. In order to establish the appropriate level of EP, the Commission focused on the radiological risks associated with operation at low power and chose a level of preparedness to assure adequate protection of public health and safety at that stage of operation. The resulting regulation, 10 CFR 50.47(d), states that issuance of an operating license for fuel loading and low-power operation (up to 5 percent of rated thermal power) requires no NRC or FEMA review, findings, or determinations concerning the state or the adequacy of and capability to implement offsite emergency plans. One of the factors considered in the basis for this regulation was that the time available for taking actions to identify and mitigate an accident is sufficient to allow adequate protective actions to be taken to protect the public near the site. In the most limiting case, the additional time available was at least 10 hours.

The recent Commission-approved exemptions from EP regulations for decommissioning sites were based, in part, on supporting analyses, including site-specific determinations that in a SFP draindown event, the fuel would not reach clad ignition temperature for at least 10 hours. This period of time was judged to be conservative, and it provides a sufficient amount of time for mitigation actions to be taken or, if necessary, for local authorities to implement appropriate response actions to protect the public. The 10-hour timeframe was adequately justified for site-specific conditions in the recent exemption applications, and it has been justified in the past for other regulations, to provide a regulatory basis for a graded approach to EP for decommissioning power reactors. To support a graded approach to EP for the transition to decommissioning, the NRC staff further examined the certitude and margin provided by a

10-hour timeframe for the fuel to heat up and for taking mitigation measures and appropriate response actions.

Timeframe for Potential Releases and Mitigation Actions

In the Low-Power Rule, the worst case postulated low-likelihood event leading to fuel failure after a period of 10 hours is a small-break loss-of-coolant accident with loss of the emergency core cooling system. For a decommissioning power reactor, the worst case, postulated low-likelihood, beyond-design-basis event is a rapid draindown of the SFP and subsequent heatup of the fuel to ignition temperature. As mentioned in Section 3, to strengthen the justification of the 10-hour timeframe for regulatory purposes, the NRC staff conducted an applied research study (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 (Task 1 Report), (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 (Task 2 Report), and (3) to analyze the dose rate from the radionuclides released during a hypothetical spent fuel clad ignition accident (Task 3 Report). The results are described below.

- In the Task 1 Report, the NRC conducted a task analysis of mitigation actions at a BWR and a PWR to (1) determine the time the representative licensee's onshift decommissioning organization would take to implement procedures to mitigate a SFP draindown event and (2) estimate the likelihood of successful deployment of the mitigation measures to prevent fuel overheating. The NRC designed the task analysis to be representative of all decommissioning nuclear power plants. Researchers performed analyses for the nine initiating events identified in NUREG-1738. The results show that the representative plant staff can reliably implement mitigation strategies to mitigate cask-drop events in a timely manner and prevent spent fuel heatup damage. This study identified that only the events causing a rapid SFP water draindown (i.e., extreme earthquake and large aircraft impact) would challenge the successful mitigation of fuel heatup.

- The purpose of the analysis in the Task 2 Report was to provide information on a cooling time that would give reasonable assurance that spent fuel would not reach ignition temperature within 10 hours under adiabatic heatup conditions and thus negate the need for site-specific analyses. The analysis addressed spent fuel parameters that bound the commercial nuclear fleet, and conservatisms were applied to simplify the analysis. The report analyzed PWR and BWR assemblies in three configurations in the SFP (uniform, checkerboard, and 1x4) and both with and without the mass of the storage racks. Adiabatic heatup calculations were performed by hand and validated with a MELCOR[7] analysis. Table 1 summarizes the cooling time (in years) required for a 10-hour heatup to 900 degrees Celsius (C, 1652 degrees Fahrenheit(F)) for the hottest BWR and PWR assemblies. In Table 1, the range of cooling times needed to provide assurance that fuel would not reach 900 degrees C in under 10 hours is dependent on the fuel burnup, ranging from 45 to 72 gigawatt-days per metric ton of heavy metal (GWd/MTHM). The number in parentheses represents a burnup of 60 GWd/MTHM.

[7] MELCOR is a fully integrated, engineering-level computer code developed by Sandia National Laboratories for the NRC to model the progression of severe accidents in nuclear power plants.

Table 1 Cooling Time (Years) Required for 10-Hour Heatup Time (to 900 degrees C (1652 degrees F))

	BWR Assembly	PWR Assembly
Adiabatic (without racks)	1.06 – (1.21) – 1.39	1.48 – (1.64) – 2.12
Adiabatic (with racks)	0.61 – (0.08) – 0.92	1.27 – (1.37) – 1.77
Checkerboard or 1x4 (for 60-GWd/MTHM burnup)	< 0.8 (MELCOR estimate)	< 1.37 (based on BWR insights)

The study also analyzed the degree of benefit that could be achieved by relaxing the adiabatic heatup assumption based on realistic benefits gained from including radiative heat transfer to surrounding colder assemblies and the presence of the racks in the adiabatic calculation. The results show that including the mass of the racks in the adiabatic calculation can decrease the fuel cooling time by 50 percent and 20 percent for the BWR and PWR assemblies, respectively. Additionally, if the hot fuel is placed in a favorable fuel loading pattern, where the hottest assemblies are next to assemblies from the previous offload in a checkerboard or 1x4 pattern, the cooling times required will be even less than the adiabatic heatup values with the racks.

- The purpose of the analysis in the Task 3 Report was to examine offsite doses and dose rates for potential SFP accidents using SFP source terms developed for the consequence study in NUREG-2161. The report analyzed whether the offsite dose rates following an SFP accident are sufficiently low to provide any additional time margin (beyond the 10 hours for heatup) before offsite exposures become excessive. The report used the MELCOR Accident Consequence Code System (MACCS)[8] to analyze cumulative dose (equivalent acute bone marrow dose and lifetime committed effective dose) as a function of elapsed time (from release and from first plume arrival) and distance from the site. Regarding exceedance of EPA PAGs off site, for the largest source term studied, PAGs would be exceeded within the first hour of release at a distance of 0.5 kilometers (km, 0.3 miles (mi)), which is typically within the owner-controlled area of the plant. At 1.6 km (1 mi), PAGs would be expected to be exceeded within 2 to 3 hours, and at 8 km (5 mi), PAGs would be expected to be exceeded 8 to 9 hours after release. These times do not include the time associated with the SFP assembly draindown and heatup and initiation of an offsite release, but they are meant to assess the time margin available after a release begins before PAGs are exceeded. The results also indicate that acute fatal effects off site appear to be unlikely from either source term evaluated, provided that individuals can be relocated within a reasonable time after plume arrival; in all cases, this time was longer than 24 hours.

Timeframe for Taking Protective Actions

Previous rulemakings and the more recent exemption requests approved for decommissioning sites have determined that a period of 10 hours is a reasonable amount of time for implementing appropriate response actions off site. Evacuation studies and the analyses provided in the evacuation time estimates (ETEs) required by Section IV, “Content of Emergency Plans,” of Appendix E to 10 CFR Part 50 further support this assumption:

[8] The NRC developed MACCS to evaluate offsite consequences from a hypothetical release of radioactive material into the atmosphere. The code models atmospheric transport and deposition, emergency response and other protective actions, exposure pathways, health effects, and economic costs.

- NUREG/CR-6864 examined the efficiency and effectiveness of 230 evacuations as a result of natural or manmade events during a 13-year period from 1990 to 2003. Command, control, and coordination of evacuations were preplanned in 74 percent of the case studies and ad hoc in 26 percent of them. A regression analysis conducted in that study showed no statistical association between the type of command, control, and coordination process (i.e., ad hoc or preplanned) and evacuation efficiency. The study concluded that all the evacuations studied were successful in saving lives. Volume 2 of this report contains data on 50 case studies. Excluding four hurricane evacuations, the other 46 evacuations studied (resulting mostly from technological hazards) were effectively completed in under 10 hours, with an average evacuation time of 2 hours and 10 minutes. Additionally, it took on average only 45 minutes from the time of notification for decision makers to order an evacuation.

- Section IV of Appendix E to 10 CFR Part 50 requires licensees to develop and maintain an analysis of the time required to evacuate various sectors and distances within the plume exposure pathway EPZ, referred to as an ETE study. An analysis of the most recent ETE data shows that under a variety of normal and adverse conditions, the average time to evacuate 100 percent of the population is about 4 hours for the 2 mile (3.2 km) area surrounding the site and the average time to evacuate 100 percent of the population for the full 10 mile (16 km) EPZ is about 5 hours (with the vast majority of evacuations completed within 10 hours) (ADAMS Accession No. ML16054A042). The range and distribution of evacuation times provided in the ETE analyses are also comparable to real-world evacuations of similar scope.

The conclusion that can be drawn from these studies is that 10 hours is a sufficient amount of time for taking protective actions off site, and that extensive preplanning, while beneficial, is not a necessary prerequisite for public safety officials to be able to decide upon and implement protective measures for public health and safety.

Additional Planning Basis Element Considerations

In addition to the analyses performed by the NRC staff to support this rulemaking, the NRC has previously conducted SFP studies that support the technical basis for EP, including the following:

- NUREG-2161 considered various cooling mechanisms, as well as additional heat from oxidation. Previous studies had shown 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 10 CFR 50.54(hh)(2) (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 operating 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 staff's evaluation of the potential accident risk for a SFP at a decommissioning power reactor in the United States. Specifically, NUREG-1738 stated that fuel assembly geometry and rack configuration are plant specific, and both are subject to unpredictable changes after an earthquake or cask drop that drains the pool. Therefore, because a non-negligible decay heat source lasts many years and configurations ensuring sufficient air flow for cooling cannot be assured, the possibility of reaching the zirconium ignition temperature cannot be precluded on a generic basis. 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 unlikely, the consequences of such an accident could lead to an offsite dose in excess of the EPA PAGs.[9] 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. This lower risk supports a commensurate level of EP as discussed in Section 4.2.1 of this appendix. Several commenters referenced the results of NUREG-1738 in support of revised requirements for permanently defueled reactors.

Assessment of Emergency Preparedness Planning Basis for Decommissioning Sites

The NRC staff's analyses support a graded approach to EP for decommissioning sites and establish a generic basis for the timeframes and conditions within which spent fuel heatup, mitigation measures, or protective actions, if necessary, may take place. The Task 1 Report demonstrates that a period of 10 hours provides sufficient time to implement mitigation measures for design-basis events at decommissioning sites. The Task 2 Report provides a basis for the selection of a spent fuel decay time beyond which the fuel can reasonably be expected to take longer than 10 hours to heat up to ignition temperature and of the conservatisms associated with the adiabatic assumption. The Task 3 Report provides additional understanding of the amount of time available for taking action in response to beyond-design-basis events, including the margin of time beyond 10 hours that offsite agencies have to implement actions to protect public health and safety. As described in the Task 3 Report, the worst case beyond-design-basis event leading to a rapid draindown of the SFP and subsequent zirconium fire includes an additional time margin on the order of 1 to 8 hours beyond the 10-hour heatup time during which protective actions can be taken to protect the public before PAGs would be exceeded off site. In a more realistic scenario, it would likely take days for all of this to occur, providing sufficient time to implement successful mitigative actions.

4.2.5 Graded Standards for Emergency Preparedness

Consistent with the concept of a graded approach to EP, the NRC staff is proposing emergency planning standards that involve four stages, or levels, that coincide with significant milestones in the reduction of the radiological risk:

[9] The results of the NRC's applied research studies (Task 1 Report, Task 2 Report, Task 3 Report (ADAMS Accession No. ML16110A416)) discuss the margin of time available before an offsite release could be expected.

- Level 1—Post-Shutdown Emergency Plan
- Level 2—Permanently Defueled Emergency Plan
- Level 3—ISFSI-Only Emergency Plan
- Level 4—No Emergency Planning

These emergency plans will be required to meet a set of regulatory standards commensurate with the risk for a site in these various stages of decommissioning.

In developing the regulatory basis, the NRC staff considered the appropriateness of the EP requirements in 10 CFR Part 50 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," for decommissioning sites, including those requirements that have historically been addressed in exemptions and those that have not. The proposed standards within the levels are based on the current set of operating reactor EP standards informed by the NRC staff's supporting analyses, the basis developed to support the recent EP exemptions approved by the Commission, applicable research studies, and public comments on the advance notice of proposed rulemaking and the draft regulatory basis for this rulemaking. The NRC arrived at the proposed requirements for EP in this regulatory basis by considering all of the planning basis elements and by not isolating one specific accident sequence (e.g., SFP fire) as the worst case for which to prepare.

The NRC staff also considered the criteria of safety, economic impacts, efficiency, transparency, flexibility, and responsiveness. The discussion below addresses EP requirements that would be necessary to provide for adequate protection of public health and safety at decommissioning facilities. It describes the basis for the graded EP regulatory requirements for each level. This section also describes the proposed regulatory process for transitioning between regulatory standards and revising emergency plans. The discussion addresses public comments received on the draft regulatory basis where appropriate.

Licensee Supporting Analyses and Commitments

Decommissioning licensees submitting EP exemption requests have performed a series of supporting analyses for NRC review, as described in NSIR/DPR-ISG-02. 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.

For the reasons discussed below, under a graded approach to EP, the NRC does not anticipate a need to require decommissioning licensees to submit these analyses to the NRC for review and approval (separately from existing NRC oversight processes described below) or to certify that these analyses have been completed to support a change between EP levels.

The NRC staff anticipates that a licensee would analyze applicable DBAs using the process under 10 CFR 50.59, "Changes, tests, and experiments," and reflect the analysis in the licensee's updated final safety analysis report. The NRC staff expects that licensees have

developed and maintained mitigation strategies for beyond-design-basis events as required by NRC Order EA-12-049, "Order Modyfying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (ADAMS Accession No. ML12054A735).. The NRC staff also anticipates incorporating these mitigation strategies into the requirements for an integrated response capability for the mitigation of beyond-design-basis events rulemaking (see the draft final rule package at ADAMS Accession No. ML16301A005). For the heatup analysis, the NRC staff 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. This particular analysis supports a transition to Level 2 EP requirements, as discussed below. The NRC staff is also considering 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.[10] The proposed rule would detail this process.

If supported by the documentation described above (i.e., in the licensee's updated final safety analysis report, technical specifications, or license conditions), then after certification of permanent cessation of operations and permanent removal of fuel from the reactor vessel, the licensee would be able to transition to one of the graded EP levels described in the sections that follow. The staff describes the regulatory options for this process in Section 4.2.10. Unless otherwise specified below, the corresponding emergency plans will be subject to many of the same general documentation requirements as an operating reactor emergency plan (e.g., describe provisions for maintaining EP, describe recovery criteria following an accident).

4.2.6 Level 1: Post-Shutdown Emergency Plan

Level 1 may be entered 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, "Termination of license," or 10 CFR 52.110, "Termination of license." For a decommissioning site, the spectrum of accidents that can have significant offsite consequences is greatly reduced early on and is dominated by the highly unlikely occurrence of a zirconium fire. The primary consideration for the planning basis for EP in Level 1 (NUREG-0396) is then the potential consequences and timing of this narrow spectrum of accidents. As such, for Level 1, the NRC staff considered the time-dependent characteristics of potential releases in relationship to the time needed to implement protective actions.

The purpose of Level 1 is to provide a transition period in which to ensure that an appropriate level of EP is maintained 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. The NRC staff anticipates that licensees will remain in Level 1 for a period of 10 months (for BWRs) or 16 months (for PWRs). During this time, the licensee may 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 Level 2 permanently defueled emergency plan (PDEP). Level 1 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 Level 2. The NRC staff does not intend to require significant changes to the emergency plan during the Level 1 transition period. The discussion

[10] As discussed in Section 4.2.7 of this appendix, the licensee could conduct this analysis to justify a timeframe for transition to Level 2 that is less than 10 months for BWRs and less than 16 months for PWRs.

below addresses current requirements that could be amended during Level 1 to support a transition to a Level 2 PDEP while still providing for adequate protection of public health and safety during this transition period.

Staffing and Emergency Response Organization

The following regulations in 10 CFR 50.47 and 10 CFR Part 50, Appendix E, govern staffing of the emergency response organization (ERO):

- 10 CFR 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"

- 10 CFR 50.47(b)(2), which states, in part, "...adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available..."

- Section IV.A of Appendix E to 10 CFR Part 50, 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..."

NUREG-0654/FEMA-REP-1, Revision 1, provides specific acceptance criteria for complying with the standards set forth in the regulations. In NUREG-0654, Section II, "Planning Standards and Evaluation Criteria," Evaluation Criteria II.B.1 and II.B.5 address the adequacy of ERO staffing, including guidance on licensee minimum onshift and augmented staffing levels, augmentation times, and emergency functions as provided in Table B-1 of NUREG-0654.

Section IV.A.9 of Appendix E to 10 CFR Part 50 requires licensees to conduct a detailed staffing analysis demonstrating that onshift 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. The onshift staff must be able to cope with the spectrum of events described in NSIR/DPR-ISG-01, "Interim Staff Guidance—Emergency Planning for Nuclear Power Plants," issued November 2011 (ADAMS Accession No. ML113010523), until augmenting ERO staff arrives in accordance with the site's emergency plan commitments. The augmented ERO responders assume many managerial, engineering, and administrative duties from the onshift personnel, allowing the onshift personnel to focus more fully on plant operations.

In Level 1, the spectrum of credible accidents and operational events requiring a response from the ERO is reduced as compared to that for an operating plant, and the principal public safety concern involves the potential radiological risks associated with the storage of spent fuel on site in the SFP. 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 the reactor, reactor coolant system, 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, may not be applicable or necessary in Level 1. Commensurate with the reduced spectrum of credible accidents, the NRC staff is considering changes to the guidance on ERO staffing levels for Level 1. The onsite operations staff would continue the timely implementation of the emergency

plan while providing for, if necessary, the prompt implementation of mitigative actions in the event of an SFP accident. Communication and coordination capabilities with offsite organizations for the level of support required for the remaining DBAs would be maintained. Additionally, the ERO would continue to provide appropriate assessment capabilities and the capability to give timely protective action recommendations (PARs) to responsible offsite organizations in the unlikely event of a radiological release off site that exceeds EPA PAGs.

Because the existing ERO staffing regulations are performance based, the NRC staff does not anticipate that regulatory amendments will be needed to address ERO staffing for Level 1. The NRC staff intends to provide guidance on the minimum staffing requirements for Level 1 in a manner similar to the approach taken in NSIR/DPR-ISG-02 for licensees seeking emergency planning exemptions and changes to their staffing commitments.

Emergency Classification Levels and 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. Given the defueled nature of Level 1 facilities, 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 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. Level 1 licensees would still be required to maintain a set of EALs based on onsite radiation monitoring information and in-plant conditions and instrumentation applicable to a defueled reactor.

Nuclear Energy Institute (NEI) 99-01, Revision 6, “Development of Emergency Action Levels for Non-Passive Reactors,” issued November 2012 (ADAMS Accession No. ML12326A805), provides EALs for non-passive operating nuclear power reactors, permanently defueled reactors, and ISFSIs. The NRC endorsed NEI 99-01, Revision 6, in a letter dated March 28, 2013, as an acceptable method of developing EALs (ADAMS Accession No. ML12346A463). Licensees desiring to make an EAL scheme change must still submit the change to the NRC for prior review and approval as required by Section IV.B of Appendix E to 10 CFR Part 50.

Section IV.C of Appendix E to 10 CFR Part 50 requires that emergency classes include four emergency classification levels (ECLs) defined by the NRC in NUREG-0654/FEMA-REP-1, Revision 1: (1) Notification of Unusual Event, (2) Alert, (3) Site Area Emergency, and (4) General Emergency. Under Option 2, all of these ECLs would still apply in Level 1. Although there may be no credible event that could result in a significant radiological release beyond the site boundary when a facility enters Level 1, as previously stated, 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. As such, the NRC staff concludes that maintaining ECLs up to a General Emergency would ensure that other expected actions, such as the issuance of a PAR, would occur in a timely manner to protect public health and safety.

Evacuation Time Estimate Studies

Section IV.3 of Appendix E to 10 CFR Part 50 requires licensees to use 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 (76 FR 72560; November 23, 2011), the NRC amended its regulations regarding ETEs to require licensees to periodically assess changes to the EPZ population. 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 staff 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. Based on the NRC staff'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. In addition, because Level 2 does not require preplanned PARs to provide for a prompt response to a radiological emergency (see Section 4.2.7), updates to the ETE during Level 1 would provide almost no benefit. For all of these reasons, the NRC staff concludes that the regulatory 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 to periodically update ETEs should no longer be required in Level 1. Existing ETE analyses would remain effective within the emergency plan until no longer required in Level 2.

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, 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 regulatory standards for offsite radiological EP for decommissioning sites (including the removal of EPZ requirements), the NRC would not require the 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. The NRC staff intends to provide guidance on what the final dissemination of public information should include.

Drill and Exercise Program

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 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. 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 radiological EP 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 off site is significantly reduced in Level 1 and because regulatory standards for offsite radiological EP 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 staff anticipates that it will need to clarify further through regulation or guidance the timing and scope of full-participation exercises and drills 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 exercise and drill requirements in consultation with FEMA.

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 the physical protection regulations in 10 CFR Part 73, "Physical Protection of Plants and Materials." Several commenters requested that the NRC continue to consider hostile action events in establishing levels for EP.

As discussed in Section 4.2.7 of this appendix, hostile action requirements would not apply to decommissioning sites that have progressed to Level 2. The NRC staff 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. Specifically, the spent fuel has not yet undergone a significant period of decay, necessitating formal offsite radiological emergency planning. As previously stated, the primary considerations for the planning basis for EP in Level 1 are the potential consequences and timing of the accident. Although the study in NUREG-1738 did not evaluate the potential consequences of a sabotage event that could directly cause offsite fission production dispersion, the NRC staff did study the potential consequences of the zirconium fire event at different spent fuel decay times. Within the timeframe proposed for Level 1, the study in NUREG-1738 shows that decay time is significant when considering short-term radiological consequences. Additionally, significant changes to the onsite and offsite emergency plans would not be made during Level 1. As such, the NRC staff

is proposing to maintain EP requirements related to hostile action during Level 1. However, consistent with the above discussion on exercise and drill requirements, the NRC staff concludes that continuing with full-participation hostile-action-based exercises would provide limited safety benefit to a facility that is decommissioning. The NRC staff proposes to remove the hostile-action-based 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 exercises and drills.

Emergency Response Data System

Section VI, "Emergency Response Data System," 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. Section VI.2 of Appendix E provides that nuclear power facilities that are shut down permanently or indefinitely are not required to provide hardware to interface with the NRC receiving system. Under Option 2, licensees in Level 1 would need to maintain a capability to provide meteorological, radiological, and SFP data (e.g., level, flow, and temperature data) to the NRC within a reasonable timeframe, but they would no longer be required to maintain an ERDS in accordance with current regulations. Several comments expressed that an ERDS should be required for decommissioning sites in order to inform decision making for OROs. However, some commenters expressed support for removing ERDS requirements. The NRC's ERDS requirements only address transmission to the NRC and do not require licensees to transmit data to OROs, although licensees may have agreements in place to provide such information to OROs in the event of an emergency. The removal of the ERDS requirements under Option 2 would not affect a licensee's ability to provide information to OROs as long as such agreements remain in place.

4.2.7 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 staff is considering providing two regulatory alternatives to specify when the transition to a Level 2 PDEP may occur: (1) transition after a specified amount of cooling time in Level 1, or (2) transition after an alternative timeframe based on a site-specific analysis that shows the fuel cannot heat up to clad ignition temperature within 10 hours under adiabatic conditions. Several commenters supported these proposed options.

The NRC staff's analysis of spent fuel decay times provided information on fuel heatup time to 900 degrees 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 staff concluded 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. These cooling times are based on a 10-hour adiabatic heatup to 900 degrees C assuming the decay heat value for the hottest assembly (rather than average), a

burnup of 60 GWd/MTHM,[11] and a uniform loading pattern and accounting for the mass of the racks. This does not account for the additional margin to heatup that would be provided by a more favorable SFP configuration such as a 1x4 or checkerboard, and the NRC determined it to be conservative for regulatory purposes. The NRC staff notes that the cooling 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). During the development of the proposed rule, the NRC staff will consider any necessary conditions for parameters outside of the NRC staff's past analysis. The proposed regulations would provide for transition to Level 2 after the specified time has passed, with potential conditions as discussed above. The NRC staff may also provide licensees with the option to submit a site-specific analysis proposing an alternative cooling period, but such analyses would be subject to NRC review and approval before a transition to Level 2. The regulations would specify an acceptable cooling time in order to relieve licensees of the regulatory burden of providing a site-specific analysis. One alternative that the NRC staff could pursue in the proposed rule is the development of a chart that defines minimum cooling time as a function of fuel type, burnup, and enrichment for inclusion in the regulations. The NRC would determine the details on these issues during the proposed rule phase of this rulemaking.

As demonstrated in the results of the NRC staff's task analysis of mitigation actions (Task 1 Report), a period of 10 hours will provide sufficient time for plant staff to reliably implement mitigation strategies to prevent spent fuel heatup damage. Additionally, as noted in the Task 3 Report, the worst case beyond-design-basis event leading to a rapid draindown of the SFP and subsequent zirconium fire includes an additional time margin on the order of 1 to 8 hours beyond the 10-hour heatup time during which protective actions can be taken to protect the public before EPA PAGs would be exceeded off site. Because of the additional time available to take mitigation actions or, if necessary, to implement protective actions, many requirements applicable to permanently defueled reactors (under Level 1) would not be applicable to licensees with sufficiently decayed spent fuel (under Level 2). The following discussion addresses the requirements that would be necessary to adequately protect public health and safety at facilities in Level 2.

Staffing and Emergency Response Organization

Table 2 describes the proposed minimum emergency response staffing requirements for licensees in Level 2. This table, adapted from NSIR/DPR-ISG-02 (as adapted from Table B-1 in NUREG-0654/FEMA-REP-1, Revision 1), describes the minimum emergency response staffing requirements for decommissioning nuclear power plants licensed in accordance with 10 CFR Part 50 and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

[11] MELCOR calculations discussed in the Task 2 Report were calculated for a burnup of 60 GWd/MTHM, which is consistent with the assumption in NUREG-1738. In NUREG-1738, the decay heat for 60 GWd/MTHM was extrapolated from the values for a limiting burnup of 50 GWd/MTHM reported in NUREG/CR-5625, "Technical Support for a Proposed Decay Heat Guide Using SAS2H/ORIGEN-S Data," issued July 1994.

Table 2 Minimum Emergency Response Staffing Requirements for Facilities in Level 2

MAJOR FUNCTIONAL AREA	MAJOR TASKS	EMERGENCY POSITION, TITLE, OR EXPERTISE	ON SHIFT	AUGMENTED STAFF CAPABILITY FOR RESPONSE IN 2 HOURS
Plant Operations and Assessment of Operational Aspects	Plant Operations	Shift Supervisor Shift Operator	1 1	
Emergency Direction and Control	Emergency Coordinator	Shift Supervisor	*	
Notification/ Communication	Notify State and Federal Personnel and Maintain Communications	Communicator	*	
Radiological Accident Assessment and Support of Operational Accident Assessment	Onsite Dose Assessment and Monitoring	Health Physics Expertise	*	1
Protective Actions (In-Plant)	In-Plant Surveys Radiation Protection • Access Control • HP Coverage for Repair, Corrective Actions, Search and Rescue, First Aid, and Firefighting • Personnel Monitoring • Dosimetry	Health Physics Technician	1	As needed
Engineering Support	Technical Direction	Technical Expertise		1
Plant Condition Evaluation, Repair, and Corrective Action	Repair, Mitigation, and Corrective Action	Shift Operators	**	As needed
Firefighting	Firefighting	Per Fire Protection Plan		
Rescue Operations/ First Aid	Rescue and First Aid		*	As needed
Security	Security	Per Security Plan		

*May be provided by shift personnel assigned other functions. Identify if the shift personnel assigned EP functions/tasks are from Firefighting or Security resources.
**Number of additional personnel required to perform site-specific mitigation strategies required for a catastrophic loss of SFP inventory.

In addition, licensees in Level 2 would be required to include the following in their emergency plans:

- specification of the onsite emergency organization of plant staff personnel for all shifts and its relation to the responsibilities and duties of the normal staff complement

- designation of an individual who shall be on shift at all times and who shall have the authority and responsibility to immediately and unilaterally initiate any emergency actions

- establishment of the functional responsibilities assigned to the emergency coordinator

At facilities in Level 2, the augmenting staff would need to include engineering capability appropriate for SFP accident mitigation, but it may otherwise be reduced. For example, licensees in Level 2 would not have to comply with the requirement under Section IV.A.3 of Appendix E to 10 CFR Part 50 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. The emergency plan for licensees in Level 2 would need to include specific assignments for emergency situations for all shifts and for plant staff members, both on site and away from the site. Licensees in Level 2 would need to be able to augment onshift capabilities within 2 hours after declaration of an emergency.

Section IV.A.9 of Appendix E to 10 CFR Part 50 requires licensees to conduct a detailed staffing analysis demonstrating that onshift 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. In the 2011 EP Final Rule, the NRC concluded that the staffing analysis requirement was not necessary for nonpower reactor licensees because of the small staffing levels required to operate the facility. For this same reason, licensees in Level 2 would no longer be required to perform this analysis under Option 2.

Emergency Classification Levels and Emergency Action Levels

Section IV.C.1 of Appendix E to 10 CFR Part 50 requires that EALs are based, in part, on onsite and offsite radiation monitoring data. Under Option 2, only the ECLs of Notification of Unusual Event and Alert would apply to licensees in Level 2. In Level 2, 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 in Level 2, time will be available to initiate 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 be expected to exceed the EPA PAGs and the available time to initiate mitigation measures consistent with plant conditions or, if necessary, to implement appropriate response actions off site, Level 2 would not require declarations of Site Area Emergency and General Emergency and the associated offsite radiation monitoring systems. The results from the task reports previously discussed support this conclusion.

Consistent with the discussion on Level 1, 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 in Level 2. The EALs that the NRC found acceptable in NEI 99-01, Revision 6, are consistent with the ECLs for Level 2. A licensee desiring to make an EAL scheme change as part of the PDEP must follow the requirements of Section IV.B of Appendix E to 10 CFR Part 50.

Emergency Assessment, Classification, and Declaration

Section IV.C.2 of Appendix E to 10 CFR Part 50 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 (see the supporting discussion in the next section on offsite radiological emergency response plans). For these reasons, the NRC staff concludes that licensees in Level 2 would not be required to assess, classify, and declare an emergency condition within 15 minutes. The NRC staff is still determining the exact timeframe that it will require for emergency declaration for licensees in Level 2 and will provide that information at the proposed rule stage; however, the staff has concluded that this time should not exceed 60 minutes.

Offsite Radiological Emergency Response Plans

The transition to Level 2 would be conditioned upon the presumption, as supported by analyses, that the licensee is wholly capable of and responsible for mitigating the consequences of an event. Licensees must also demonstrate that adequate physical security remains to protect the spent fuel and that the onsite staff can perform adequate mitigation strategies.

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 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. In a hypothetical SFP accident scenario, 10 hours is not 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. The 10-hour period is also not intended to represent the time that it would take to repair all key safety systems or to repair a large SFP breach. Instead, 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 implement appropriate action to protect public health and safety.

This 10-hour time period is assured through conservative analyses of the amount of time it would take spent fuel stored in the SFP to reach the zirconium ignition temperature under conditions of adiabatic heatup, as previously discussed in this appendix. The NRC staff concludes that, for entry into Level 2, site conditions must provide a period of at least 10 hours to initiate mitigation measures or to implement appropriate response actions off site, and, therefore, regulatory standards for offsite radiological emergency plans would no longer be necessary for the adequate protection of public health and safety. As discussed in this appendix, Level 2 licensees would still maintain a variety of onsite capabilities that may be available to support OROs in EP and response, including radiological training (as discussed in Section 4.2.6), regular coordination with OROs, radiological assessment capabilities, and the ability to make PARs upon request (discussed below).

Many commenters expressed concerns that OROs may not have adequate funding or training to address a radiological emergency if offsite radiological EP requirements were revised or

reduced. No action is 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 exist outside of radiological EP, including the requirement for licensees to maintain a fire protection plan in 10 CFR 50.48, "Fire protection," and physical security requirements in 10 CFR Part 73. Many communities have comprehensive all-hazards response or comprehensive emergency management plans in place to supplement these capabilities. OROs will continue to take actions to protect public health and safety as they would at any other industrial site, and, under Option 2, the NRC would still expect licensees and OROs to establish memoranda of understanding for firefighting, law enforcement, and ambulance/medical services. As currently required under Sections IV.A.6 and A.7 of Appendix E to 10 CFR Part 50, licensee emergency plans would still be required to identify local offsite services and assistance expected from governmental agencies. This approach is consistent with requests from several commenters that the NRC maintain requirements for licensees to have formal agreements with OROs in place for emergency response.

NUREG-0396 states, "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." A beyond-design-basis event is likely to result in the activation of Federal resources. The "Nuclear/Radiological Incident Annex to the Response and Recovery Federal Interagency Operational Plans," issued October 2016, describes the Federal resources available to support OROs under the National Response Framework.

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 Option 2, licensees in Level 2 would be required to promptly notify OROs and to make this notification no later than 1 hour after declaration of an emergency. This notification requirement is consistent with the requirements for current nonpower reactor licensees. 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 staff concludes that 60 minutes provides sufficient time for ORO notification in Level 2.

Public Alert and Notification Systems

Section IV.D.3 of Appendix E to 10 CFR Part 50 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 off site and the available time for event mitigation, the public alert and notification system specified in Section IV.D.3 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 in Level 2. Several commenters opposed a revision to the public alert and notification system requirements because of a decommissioning site's reduced response capabilities. As discussed above, 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 sufficient time would be available to inform the public and implement protective actions, if necessary.

Plume Exposure Pathway and Ingestion Exposure Pathway Emergency Planning Zones

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. The NRC received several comments both supporting and opposing the removal of EPZ requirements for decommissioning sites. 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 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, EPZs would not need to be maintained in Level 2.

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 in accordance with the requirements in 10 CFR 50.47(b). Evaluation Criterion J.7 of NUREG-0654/FEMA-REP-1, Revision 1, states that, "Each licensee shall establish a mechanism for recommending protective actions to the appropriate State and local authorities." Several comments supported the removal of PAR requirements for licensees in Level 1 or Level 2. Consistent with the removal of regulatory standards for offsite radiological EP for decommissioning sites (including the removal of EPZ requirements), licensees in Level 2 would not need to develop preplanned PAR strategies. The planning basis for Level 1 considers the time-dependent characteristics of potential releases in relationship to the time needed to implement protective actions. Although there may be no credible event that could result in a significant radiological release beyond the site boundary when a licensee enters Level 1, as previously stated, 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, and thus PARs would still be required for licensees in Level 1. For 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 still require licensees in Level 2 to determine whether a radiological release is occurring. If a release is occurring, then the licensee staff would be required to communicate that information to offsite authorities within 60 minutes (see the discussion above on Level 2 notification requirements) for their consideration in taking appropriate response actions.

In 2001, the NRC revised its EP regulation to consider including 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 (66 FR 5427; January 19, 2001). For Level 2, in addition to not needing preplanned 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.

Licensees in Level 2 would still be required to provide protective actions for any emergency workers who may have to respond to the site for firefighting, law enforcement, and

ambulance/medical services. Additionally, licensees in Level 2 would still be required to protect the health and safety of members of the public present within the owner-controlled area in case of a radiological emergency.

Evacuation Time Estimate Studies

Licensees must develop and update ETEs in accordance with the requirements in 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 PARs and to provide ETEs to State and local governmental authorities for use in developing offsite protective action strategies. Consistent with the removal of standards for EPZs and PARs, maintaining ETEs would no longer be required in Level 2.

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. These requirements have not been exempted for decommissioning reactors to date, and the NRC staff has determined that facilities in Level 1 and Level 2 would still need to maintain these capabilities.

Section VI.E.8 of Appendix E to 10 CFR Part 50 requires nuclear power reactor licensees to have an onsite technical support center (TSC), an onsite operational support center (OSC), and an emergency operations facility (EOF). In accordance with NUREG-0696, "Functional Criteria for Emergency Response Facilities," issued February 1981 (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 a 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.

Several commenters expressed that there is no longer a need for separate, dedicated facilities for the EOF, TSC, and OSC at decommissioning sites. For Level 2, the NRC staff concludes that the functions of the control room, EOF, TSC, and OSC could be combined into one or more locations. Because of the low probability of DBAs or other credible events expected to exceed EPA PAGs, the significantly reduced staff, and the minimal expected offsite response required, offsite agency response would not be required at an EOF and onsite actions may be directed from the control room or other location, without the requirements imposed on a TSC or EOF. Additionally, 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.

Section IV.E.9 of Appendix E to 10 CFR Part 50 addresses requirements for emergency communications systems, plans, and arrangements. Requirements to maintain communication systems (with backup power) and communication plans would remain in place. The NRC would

make slight modifications to the communication arrangement requirements in paragraphs VI.E.9.a, c, and d for licensees in Level 2 because many of the referenced facilities (e.g., TSC, EOF) would no longer be required in Level 2. Communications with State and local emergency operations centers would be maintained to coordinate assistance on site if required.

Technical Support Center, Operational Support Center, and Emergency Operations Facility Designated Staff

As facilities proceed through decommissioning, specific requirements for TSC, OSC, and EOF designated staff equivalent to an operating power reactor would also no longer be applicable to licensees in Level 2. 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 initiate mitigation measures consistent with plant conditions or, if necessary, to implement response actions, licensees in Level 2 would not need to maintain the TSC, OSC, and EOF designated staff or offsite field dose assessment teams. Table 2 gives minimum staffing requirements for facilities in Level 2.

Hostile Action Requirements

Section IV.A.7 of Appendix E to 10 CFR Part 50 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 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, the NRC staff concludes that facilities in Level 2 do not fall within the scope of "hostile action" and that 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 for facilities in Level 2.

Although this rationale justifies the exclusion of facilities in Level 2 from the definition for a "hostile action" and its related requirements (including conducting hostile action exercises) as they apply to EP, elements for security-based events would be maintained for facilities in Level 2, including EALs for security-based events. Licensees in 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. For physical security, the objective for facilities in Level 2 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.

Drill and Exercise Program

In addition to the proposed changes to the drill and exercise program starting in Level 1, some of the principal functional areas that must be incorporated into drills (e.g., PAR development, assessment of offsite impact of radiological releases) would no longer be applicable in Level 2.

The NRC staff intends to provide guidance for the conduct of drills and exercises for decommissioning sites.

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 requires offsite radiological EP plans for each site to be exercised biennially with full participation by offsite authorities having a role under the radiological response plan. Consistent with the removal of regulatory standards for offsite radiological EP for decommissioning sites (including the removal of EPZ requirements), ORO participation in radiological drills and exercises would no longer be required for licensees in Level 2, although licensees in Level 2 would be required to offer OROs the opportunity to participate.

4.2.8 Level 3: All Spent Fuel Transferred to an Independent Spent Fuel Storage Installation

A licensee with an ISFSI 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 already provided in 10 CFR 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 10 CFR 72.32 once all spent fuel is transferred to an ISFSI. Under Option 2, these two categories of licensees in Level 3 (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 subject to the same requirements as currently exist under 10 CFR 72.32. Because the technical basis for the requirements in 10 CFR 72.32 already exists, this regulatory basis document does not address the technical basis for the EP requirements under Level 3.

4.2.9 Level 4: All Spent Fuel and Radioactive Material Removed from Site

Once all spent fuel and sources of radioactivity have 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. Several comments supported the removal of EP requirements in Level 4.

4.2.10 Additional Amendments for Emergency Preparedness

Applicability of 10 CFR 50.54(s)(2)(ii) and (s)(3)

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. The relationship between the NRC and FEMA concerning findings of reasonable assurance of offsite EP is based on the AEA, the ERA, the NRC Authorization Act of 1980, the NRC's regulations, a memorandum of understanding between the two agencies, and case law. The conclusion consistently reached over the years is that 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 Commission's responsibility to make such findings, the Commission 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.

In the Low-Power Rule, 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 in which to take action to protect the public in even the worst case accident. Similarly, for decommissioning power reactors, the staff is proposing that if the NRC determines that assurance of offsite radiological EP is not required, then such findings and determinations by FEMA would not be needed in order for the NRC to make determinations regarding reasonable assurance under 10 CFR 50.54(s)(2)(ii).

Therefore, the NRC staff is considering changes to clarify that 10 CFR 50.54(s)(3) applies to offsite emergency plans only when regulations require the assurance of offsite radiological EP. This amendment would be generally applicable and not specific to decommissioning sites (e.g., it would apply in the future to the regulatory framework for small modular reactors or other new reactor technologies). Further, 10 CFR 50.54(s)(2)(ii) would continue to apply to licensees as a condition of the license during decommissioning.

Notifications under 10 CFR 50.72

The regulations in 10 CFR 50.72, "Immediate notification requirements for operating nuclear power reactors," provide notification requirements and stipulations for a number of 1-hour, 4-hour, and 8-hour reports by the licensee to the NRC. The NRC staff uses the information reported under 10 CFR 50.72 and 10 CFR 50.73, "License event report system," in responding to emergencies, monitoring ongoing events, confirming licensing bases, studying potentially generic safety problems, assessing trends and patterns of operational experience, monitoring performance, identifying precursors of more significant events, and providing operating experience to the industry. NUREG-1022, Revision 3, "Event Reporting Guidelines: 10 CFR 50.72 and 50.73," issued January 2013 (ADAMS Accession No. ML13032A220), contains guidelines that the NRC staff considers acceptable for use in meeting these reporting requirements. With regard to EP, 10 CFR 50.72(a)(1)(i) requires that licensees report any emergency declarations to the NRC within 1 hour. Additionally, 10 CFR 50.72(b)(3)(xiii) requires a report within 8 hours for "any event that results in a major loss of emergency assessment capability, offsite response capability, or offsite communications capability (e.g., significant portion of control room indication, Emergency Notification System, or offsite notification system)." The NRC staff does not anticipate any amendments to these regulations as they apply to decommissioning sites. The 1-hour reporting requirement of 10 CFR 50.72 is consistent with the proposed regulations for notification requirements for licensees in Level 2. The 8-hour reporting requirement of 10 CFR 50.72(b)(3)(xiii) will also continue to apply; however, since many of these capabilities may not be requirements of a PDEP, the NRC staff intends to provide additional guidance in NUREG-1022, or a similar document, to clarify how the regulation applies to facilities in decommissioning.

Change Process under 10 CFR 50.54(q)

This section describes the proposed process for transitioning between levels and making changes to emergency plans under Option 2. The regulations in 10 CFR 50.54(q)(2) require licensees 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 change process under 10 CFR 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 the changes to have a minimal 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 staff screens emergency plan changes, including EAL changes, and reviews a sample of changes submitted under 10 CFR 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 10 CFR 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 staff's approval of the original plan or the basis for any subsequent change to the plan—whether those changes were approved by the NRC staff or implemented by the licensee without prior NRC staff approval under 10 CFR 50.54(q). RG 1.219, Revision 1, "Guidance on Making Changes to Emergency Plans for Nuclear Power Reactors," issued July 2016 (ADAMS Accession No. ML16061A104), describes a method that the NRC considers acceptable to implement the requirements in 10 CFR 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 a number of licensing-basis documents to inform a 10 CFR 50.54(q) evaluation, the foremost of which are the regulatory requirements, which are binding on the licensee unless the NRC explicitly exempts the licensee from them.

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, regulatory or otherwise, to which the licensee has committed. The regulations in 10 CFR 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 defined as a capability or resource necessary to prepare for, and respond to, a radiological emergency, as set forth in the planning standards of 10 CFR 50.47(b) and the elements of Section IV of Appendix E to 10 CFR Part 50. In considering a graded approach to EP, the NRC staff recognizes that a transition between the EP requirements of each level is not equivalent to making changes to the emergency plan within a level. The transition between EP levels is essentially a licensee's commitment to a different set of EP standards and associated emergency planning functions, and the change process should recognize this distinction. The NRC received several comments suggesting changes to 10 CFR 50.54(q). Some commenters suggested that changes between levels should not constitute a reduction in effectiveness. Other commenters suggested that permanently shutdown and defueled licensees should be allowed to use the 10 CFR 50.59 process to make emergency plan changes if licensees were required to develop a revised accident analysis that reflects the current status of the site.

Under the current process of granting EP exemptions for decommissioning, the NRC determines that the exemptions can be implemented without reducing reasonable assurance

that adequate protective measures can and will be implemented. Once the NRC grants the licensees exemptions from EP requirements, the licensees do not need to submit a separate license amendment request for NRC approval of the emergency plan unless the plan changes go beyond those resulting from the exemptions granted. It is the NRC's intention that this rulemaking effort would establish clear regulatory requirements for EP, reducing the need to request certain exemptions. As such, the NRC staff is considering modifications to the regulations in 10 CFR 50.54(q) that would establish the process for (1) transitions between regulatory EP standards and (2) changes to emergency plans subject to the graded EP standards. The NRC staff does not anticipate any EP-related changes to 10 CFR 50.59 as a result of this rulemaking option.

Plan Changes for Transitions between Levels

For transitions between levels, the NRC would require licensees to establish emergency plans that meet the regulatory EP standards for the next level. The NRC staff is considering two options: (1) submit plan changes to the NRC for approval, or (2) provide a change process for licensees to make changes to the plan without prior NRC approval.

Option 1: Using the license amendment process under 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," the licensee would submit, for NRC prior review and approval, a revised emergency plan that describes the licensee commitments and plan features to meet one of the graded levels (i.e., Post-Shutdown Emergency Plan, Permanently Defueled Emergency Plan, or ISFSI-Only Emergency Plan). The NRC would review and document its review of this submission in a safety evaluation report. This would establish NRC documentation that the licensee has maintained reasonable assurance and would provide a documented, approved emergency plan as a licensing basis against which future changes could be compared.

Under the requirements of 10 CFR 50.54(q), the NRC has depended upon the licensee to review changes to its emergency plans against the current NRC-approved plan. This option would provide for regulatory certainty, public hearing rights under 10 CFR 50.91, "Notice for public comment; State consultation," and a documented baseline emergency plan against which reviews of future changes could be made. This option could also facilitate EP program inspections by providing certainty on the approved plan. However, these benefits would come at the cost of the additional licensee and NRC staff hours and expenses associated with the license amendment process.

Option 2: The licensee would be able to make changes to its emergency plan using the 10 CFR 50.54(q) process (or a similar change process) but would not need to consider whether the change is a reduction in effectiveness or request a license amendment, provided that the change is enacted to comply with the EP requirements corresponding to the licensee's level of decommissioning. Licensees making changes to their emergency plans to commit to the EP requirements of a decommissioning level would not be required to determine if the changes are reductions in effectiveness. Instead, the Commission would have already made this determination through its promulgation of the regulations on the graded EP standards and associated emergency planning functions. This regulatory approach does not go beyond the authority currently granted to licensees to make changes to their emergency plan under 10 CFR 50.54(q)(3). Although hearing rights associated with the license amendment process would no longer be available for each of these individual changes, the public would have had the opportunity to comment on the EP requirements themselves in response to the proposed rule and the drafts of the supporting guidance documents. If the licensee were to seek

additional authority to that provided by the rulemaking, the licensee would need to request exemptions from the applicable EP regulations.

After the Three Mile Island accident in 1979, regulations in 10 CFR 50.54(u) (now deleted) required licensees to upgrade their emergency plans to meet the planning standards of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50 and to submit those plans to the NRC for review. Option 2 is analogous to the approach taken when the 16 EP planning standards went into effect. Under Option 2, the NRC would not relinquish its oversight authority, as the regulation would require these emergency plans to be submitted to the NRC for review no less than 60 days before implementation. Some commenters suggested that emergency plan changes should be made available for public comment or should be coordinated with OROs. The NRC staff notes that all emergency plan changes submitted under 10 CFR 50.54(q)(5) are available on the NRC's public web site. Changes that request prior NRC approval are noticed in the *Federal Register*. Additionally, for either option, the NRC would require the licensee to allow the OROs expected to respond in case of an accident 60 days to comment on the initial submittal of the licensee's graded emergency plan changes and to submit any comments received to the NRC with the emergency plan. Regardless of the change process, emergency plans would remain subject to future inspection and enforcement actions.

Plan Changes within a Level

For emergency plan changes within each level after the plan has been implemented for Level 1 (Post-Shutdown Emergency Plan) and Level 2 (Permanently Defueled Emergency Plan), licensees would be required to follow and maintain the effectiveness of the plan, consistent with 10 CFR 50.54(q)(2), and comply with the 10 CFR 50.54(q) change process. 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 regulatory standards for the applicable level. Under 10 CFR 50.54(q)(5), licensees would be required to submit to the NRC a report of each such change within 30 days. Licensees would have to submit changes that would reduce the effectiveness of the plan for prior NRC review and approval in accordance with 10 CFR 50.54(q)(4) so that the NRC could make the requisite reasonable assurance determination. For emergency plan changes within Level 3 (ISFSI-Only Emergency Plan), the licensee would have to meet the emergency plan change requirements comparable to 10 CFR 72.44(f). The requirements in 10 CFR 72.32(a)(14) for a 60-day ORO comment period would also apply if the plan changes affect the OROs expected to respond in case of an accident. The NRC would provide additional guidance in RG 1.219, or a similar document, to assist the licensee in making its reduction in effectiveness determination.

The NRC staff concludes that an amendment to the regulatory change process is necessary for three reasons:

(1) The regulation in 10 CFR 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 kept up to date.

(2) The 10 CFR 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 standards of a decommissioning level.

(3) This regulatory approach 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.

An amendment to the regulations, as described in this appendix, supplemented as necessary by regulatory guidance, would ensure that the effectiveness of the emergency plans would be maintained. Emergency plans that comply with the proposed graded EP regulatory standards would continue to provide reasonable assurance that adequate protective measures can and will be taken. Any plan that did not meet these regulatory standards and, if applicable, the reduction in effectiveness criterion would be reviewed by the NRC and subject to further inspection. The proposed approach to transitioning between levels and making emergency plan changes within the levels would provide an efficient and effective regulatory change process and would promote consistent and predictable implementation and enforcement.

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 NRC received comments both supporting and opposing revisions to 10 CFR 50.54(t), including comments asserting that licensees should be allowed to conduct reviews every 24 months and comments suggesting that the NRC should remove the requirement to review the adequacy of interfaces with State and local governments. Considering the expected duration and intended purpose of Level 1 and the anticipated changes to emergency plans for Level 2, the NRC staff concludes that it would be appropriate to ensure that this audit is conducted as soon as reasonably practicable after a licensee has implemented its Level 2 emergency plan.

Because of the reduced spectrum and low probability of potential accident scenarios at a permanently shutdown and defueled power reactor, and in order to support the transition to a PDEP and ensure a practicable timeframe for review, the NRC staff is considering an amendment to the regulation such that, starting in Level 1, licensees would be able to conduct program element reviews under 10 CFR 50.54(t) at intervals not to exceed 24 months (rather than 12 months) without conducting an assessment against performance indicators. This regulatory approach would align the first such review for a PDEP to shortly after the plan has been implemented and would eliminate the potential to expend resources during Level 1 in reviewing transitional program elements.

4.2.11 Assessment of Option 2

Option 2 would revise the current EP regulations in 10 CFR Part 50. This option would provide regulatory certainty for EP requirements for permanently shutdown and defueled facilities. This option would also reduce the need to use the exemption process, which would significantly reduce the administrative burden to licensees and the NRC staff associated with the processing of exemptions on a case-by-case basis. As discussed below, overall, the proposed approach would provide ongoing cost savings to licensees, and one-time costs followed by ongoing cost savings to the NRC, while maintaining the reasonable assurance of public health and safety. Option 2 would result in small ongoing costs associated with the submission by licensees and

review by NRC staff of emergency plans committing to the proposed graded EP regulatory standards.

5 REGULATORY SCOPE

The proposed EP requirements under Option 2 would implement a graded approach, in which requirements for decommissioning sites are adjusted commensurate with the level of risk posed within each stage of the decommissioning process. The proposed EP requirements would include revisions to 10 CFR 50.47, 10 CFR 50.54, 10 CFR 50.72, and Appendix E to 10 CFR Part 50. They would address such topics as EALs and ECLs; notifications to State and local governmental agencies; ERDS; TSC, OSC, and EOF facilities and designated staff; staffing; drill and exercise programs; offsite radiological emergency response plans; public alert and notification systems; EPZs; annual dissemination of public information; offsite PARs; ETE studies; and EP program element reviews.

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

6.1 NRC Guidance

The NRC would develop new EP-specific guidance as a result of Option 2. The agency would issue draft guidance documents with the proposed rule. The NRC staff may update the following EP guidance documents or include relevant portions in a new guidance document specific to decommissioning facilities:

- RG 1.219[12]
- NSIR/DPR-ISG-01
- NUREG-1022
- Inspection Procedure 82501, “Decommissioning Emergency Preparedness Program Evaluation,” dated September 4, 2014
- Inspection Procedure 82401, “Decommissioning Emergency Preparedness Scenario Review and Exercise Evaluation,” dated September 4, 2014

6.2 Policy Issues on Emergency Preparedness

6.2.1 Defense-in-Depth

Defense-in-depth is an element of the NRC's safety philosophy that employs successive compensatory measures to prevent accidents or mitigate damage if a malfunction, accident, or naturally caused event occurs at a nuclear facility. The defense-in-depth philosophy ensures that safety will not be wholly dependent on any single element of the design, construction, maintenance, or operation of a nuclear facility. In its policy statement, “Safety Goals for the

[12] The NRC staff updated RG 1.219 in July 2016 to clarify the applicability of the 10 CFR 50.54(q) change process to facilities that are permanently shutdown and defueled. The staff may need to be make further updates to this RG to address the graded approach for decommissioning described in this document.

Operation of Nuclear Power Plants" (51 FR 30028; August 4, 1986), the NRC states that EP is an integral part of the defense-in-depth concept. EP as part of defense-in-depth gives reasonable assurance that actions can be taken to protect the population around nuclear facilities in the unlikely event of an accident. This reasonable assurance is provided by the NRC's EP regulations, such as those in 10 CFR 50.47 and Appendix E to 10 CFR Part 50, for which findings and determinations are made as to whether the onsite and offsite emergency plans are adequate and can be implemented.

The planning basis for EP, established in NUREG-0396, was endorsed for use in the agency's policy statement of October 23, 1979 (44 FR 61123). The NRC requires EP as a matter of prudence rather than in response to a quantitative analysis of accident probabilities. In fact, the effectiveness of an emergency plan is independent of accident probability. Consequently, EP is risk-informed, rather than risk-based. The planning basis includes the stipulation that 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. Planning should be based upon knowledge of the potential consequences, timing, and release characteristics of a spectrum of accidents, including severe accidents. However, 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. As such, this regulatory basis contains a risk-informed graded approach to EP for decommissioning sites that maintains the defense-in-depth philosophy.

Under the safety analysis in NUREG-1738, the event sequences important to risk at a decommissioning power reactor are limited to a large earthquake and cask-drop events. When reviewing EP exemption requests, the NRC considered the need to maintain defense-in-depth to prevent and mitigate the consequences of these events and approved exemptions based on the licensee's site-specific justifications as well as consideration of the regulatory objectives. The NRC received public comments stating that exemptions from existing EP requirements deviate from the NRC's defense-in-depth approach to regulation and ignore the consequences of potential beyond-design-basis events. However, as described in NSIR/DPR-ISG-02, the NRC's approval of exemptions from EP requirements for licensees in decommissioning is based, in part, on an evaluation of site-specific analyses demonstrating that (1) the radiological consequences of the remaining applicable DBAs would not exceed the limits of the EPA PAGs at the exclusion area boundary; (2) in the event of a beyond-design-basis event resulting in the partial draindown of the SFP to the point that cooling is not effective, there is a period of at least 10 hours (assuming an adiabatic heatup) from the time that the fuel is no longer being cooled until the hottest fuel assembly reaches 900 degrees C; (3) adequate physical security is in place to assure implementation of security strategies that protect against spent fuel sabotage; and (4) in the unlikely event of a beyond-design-basis accident resulting in a loss of all SFP cooling, a licensee has sufficient time to implement preplanned mitigation measures to provide makeup or spray to the SFP before the onset of a zirconium cladding ignition. With these exemptions, the NRC has considered the potential for beyond-design-basis events and maintained its commitment to the defense-in-depth philosophy, assuring that the required level of licensee EP is commensurate with the risk to public health and safety and the common defense and security at the licensee's site.

In considering a basis for the proposed regulations governing EP for decommissioning sites, the NRC staff maintained a defense-in-depth philosophy in which emergency planning is the last in a series of barriers to protect the public. NUREG-1738 describes how the defense-in-depth

philosophy applies to the operation of the SFP in a decommissioning plant and to potential regulatory changes contemplated for decommissioning plants:

> Implementation of defense-in-depth for SFPs is different than for nuclear reactors because the hazards are different. The robust structural design of a fuel pool, coupled with the simple nature of the pool support systems, goes far toward preventing accidents associated with loss of water inventory or pool heat removal. Additionally, because the essentially quiescent (low-temperature, low-pressure) initial state of the SFP and the long time available for taking corrective action associated with most release scenarios provide significant safety margin, a containment structure is not considered necessary as an additional barrier to provide an adequate level of protection to the public. Likewise, the slow evolution of most SFP accident scenarios allows for reasonable human recovery actions to respond to system failures, and provides sufficient time to allow for the implementation of protective actions.

In its analysis, the NRC staff found that defense-in-depth in the form of accident prevention and mitigative measures and an appropriate level of emergency planning can limit risk and provide reasonable assurance that actions can and will be taken to protect the population around nuclear facilities in the highly unlikely event of an accident.

6.2.2 Reasonable Assurance

The AEA authorizes the Commission to establish, by rule, minimum criteria for the issuance of licenses for utilization facilities in a manner that protects public health and safety. The Commission has stated that compliance with its regulations and guidance is presumptive of providing reasonable assurance of the adequate protection of public health and safety and the common defense and security (53 FR 20603, 20606; June 6, 1988). Before it issues a license, the NRC is required by 10 CFR 50.47(a) to make a finding that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. Therefore, emergency plans are considered adequate—and thus provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency—if they comply with the NRC's regulations and, more specifically, the 16 planning standards in 10 CFR 50.47(b). A licensee must follow and maintain the effectiveness of its emergency plan if the NRC is to continue to find, under 10 CFR 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. If, at any time after it issues the license, the NRC determines that the licensee's state of EP does not provide such assurance and the licensee does not correct the deficiency within 4 months, the Commission will determine whether the plant will be shut down or whether other enforcement actions would be appropriate.

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 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 comprehensive preparedness guides and exercise methodologies.

In particular, 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. 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.

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 would there be a potential need to implement response actions off site. Although this incident is uniquely radiological in nature, protective actions such as evacuation are not unique to radiological events and occur frequently in response to other unique hazards such as chemical spills, fires, and hurricanes. State and local governments are responsible for the protection of public health and safety, 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, there is a high level of assurance that appropriate response actions can and will be taken in the event of a radiological emergency. As such, reasonable assurance can be maintained 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.

The proposed graded approach to EP established in this regulatory basis would (1) provide an adequate basis for an acceptable state of EP and (2) ensure that coordination and applicable arrangements with offsite agencies are maintained (e.g., notification, assistance resources). The establishment of emergency plans for decommissioning sites would not require the Commission to make new findings of reasonable assurance. The NRC derived the proposed graded approach to EP, based, in part, on previously approved exemptions from the current operating reactor regulatory requirements for which it has already made findings of reasonable assurance of emergency plans and their implementation, and recently conducted research. The NRC will maintain these previous findings of reasonable assurance by requiring licensees to establish emergency plans that comply with the proposed graded standards for EP. As

previously stated, the NRC would not be relinquishing its oversight authority as emergency plans would remain subject to inspection and enforcement actions.

6.2.3 Implementation Issues

The implementation issues associated with the proposed graded EP regulatory standards fall into the overarching implementation issues discussed in Section 3.3 of this regulatory basis. In developing the proposed rule, the NRC staff will consider EP-specific issues such as the timing of exemptions for plants that shut down during the implementation period for this rule.

7 IMPACTS OF AN EMERGENCY PREPAREDNESS RULEMAKING

This section analyzes the two options for addressing the regulatory constraints associated with the current decommissioning process. Option 1 is the "no-action" alternative and involves the continuation of current decommissioning practices (i.e., the issuance of site-specific exemptions). Option 2 is a rulemaking approach that streamlines the current decommissioning process by implementing a graded system with comprehensive licensee requirements. The sections below discuss these options in more detail.

Under the current process, licensees undergoing decommissioning are still subject to the EP requirements of 10 CFR Part 50. As a result, these licensees have typically submitted applications for exemptions from certain EP requirements. In their applications, licensees must justify the exemption requests by demonstrating that the permanent cessation of operations and removal of fuel from the reactor vessel substantially reduce the risk of offsite radiological release compared to that for an operating power reactor. The rulemaking options presented herein are aimed at streamlining the decommissioning process by turning consistently granted, licensee-specific exemptions into generally applicable standards and reducing the burden to both licensees and the NRC while maintaining the reasonable assurance of public health and safety.

7.1 Option 1: No Action

Under this option, the NRC staff would continue with the existing decommissioning process as described in the current regulations and guidance, including the emergency planning requirements of 10 CFR Part 50. The NRC staff would not pursue any changes to the current process.

7.1.1 Impacts on Public Health, Safety, and Security

Because this option would not change the current process, there would be no increase or reduction in public health, safety, and security.

7.1.2 Impacts on Licensees

This option would have no incremental impact on licensees.

7.1.3 Impacts on the NRC

This option would have no incremental impact on the NRC.

7.1.4 Additional Considerations

This option would have no incremental impact on State, local, or Tribal governments.

7.1.5 Summary of Benefits and Costs

There would be no incremental benefits or costs to licensees or the NRC.

7.2 Option 2: Graded Approach to Emergency Preparedness

Under this option, the NRC staff would undertake a rulemaking to implement a streamlined, graded approach to the decommissioning process. The changes to the underlying regulations and guidance would create a clear set of rules and guidance for decommissioning reactors and reduce the need for EP exemptions as a licensee transitions through the decommissioning process.

The proposed approach would provide an alternative to the current site-specific decommissioning exemption and amendment process by issuing level-specific requirements for all licensees. As discussed previously, licensees for all recently decommissioning facilities have applied at the beginning of the decommissioning process for exemptions from certain emergency planning requirements in 10 CFR Part 50, given the significantly reduced risk of offsite radiological release at permanently shutdown and defueled reactors compared to that for operating facilities. Under this option, the NRC would codify many requirements from previously approved exemption requests. Thus, licensees would no longer need to submit exemption requests related to these requirements.

7.2.1 Impacts on Public Health, Safety, and Security

Because this option would involve graded EP regulatory standards commensurate with the risks associated with potential accidents within each level, there would be no reduction in public health, safety, and security.

Several commenters requested that the NRC consider any environmental impacts as a result of the changes in the EP requirements. The NRC will prepare an environmental assessment for the rulemaking that will address any environmental impacts as a result of the changes to the EP requirements for decommissioning sites. This environmental assessment will be available for public comment.

7.2.2 Impacts on Licensees

Overall, this option would result in ongoing cost savings to licensees:

- Changes to the requirements would eliminate the need for exemption requests for decommissioning sites. Licensees would no longer undergo the administrative burden associated with the exemption request process. Licensees may also be able to expedite the decommissioning process because any delays associated with processing exemptions would be eliminated.

- Licensees would incur moderate administrative burden associated with making changes to their emergency plans and submitting updated emergency plans to the NRC.

7.2.3 Impacts on the NRC

Overall, this option would result in significant one-time costs to the NRC, followed by ongoing savings:

- Initially, the NRC would have incremental costs to undertake the rulemaking process for this portion of the power reactor decommissioning rulemaking. These costs include the preparation of the proposed rule and accompanying guidance documents. The costs would include both NRC staff and contractor time to prepare proposed rule language, to draft guidance documents, supporting analyses (e.g., a regulatory analysis and Office of Management and Budget paperwork burden analysis), and a *Federal Register* notice, and to conduct public outreach efforts during the rule and guidance development phases. After publishing the proposed rule, the NRC would incur costs associated with public comment resolution and preparation of the final rule, guidance documents, and supporting documentation for the rulemaking.

- By changing the decommissioning exemption and amendment process, the NRC would reduce both the number and complexity of the exemption and amendment requests. This would result in a more efficient process and save the NRC staff time and resources.

- The NRC staff may incur administrative burden associated with reviewing updated emergency plans for decommissioning sites transitioning between levels.

7.2.4 Additional Considerations

State and local governments have the primary authority and responsibility to protect their citizens and respond to disasters and emergencies. The proposed approach would create a transitional environment for offsite emergency planners in how they consider radiological hazards. FEMA could continue to support offsite organizations as they adjust their plans, capabilities, and resources to the changing radiological threat. The proposed approach would impact FEMA in the form of reduced licensee user fees collected after discontinuation of findings and determinations of offsite radiological EP at facilities in Level 2. The regulation in 44 CFR 354.4(e) explains FEMA's process for discontinuing charges for decommissioning sites. Section 5 of this regulatory basis discusses comments received related to ORO funding for EP.

7.2.5 Summary of Benefits and Costs

<u>Benefits</u>

- enhanced clarity and predictability of the decommissioning process

- savings to all licensees by eliminating the need to use the exemption process

- possible savings to licensees because of the potential to expedite the decommissioning process

- savings to the NRC from fewer applications for exemptions to review

- maintenance of reasonable assurance of adequate protection of public health and safety commensurate with the potential risks

Costs

- one-time cost to the NRC to develop the rule and revise guidance
- costs to licensees to provide updates to emergency plans between levels
- costs to the NRC to review updates to emergency plans between levels

8 BACKFITTING AND ISSUE FINALITY

Neither of the two options presented by the NRC staff in this appendix would constitute backfitting under 10 CFR 50.109, "Backfitting," or violate any issue finality provision in 10 CFR Part 52 if the NRC implemented the option. Option 1 would maintain the status quo of exemption and license amendment requests, thereby imposing no change in requirements or NRC staff positions. Option 2 would provide licensees with a voluntary alternative to exemption and license amendment requests by amending the NRC's regulations to establish a graded approach to EP commensurate with the reductions in radiological risk as licensees proceed through the decommissioning process. Because licensees would not be required to comply with the regulations setting forth the graded approach to EP, a rulemaking for Option 2 would not constitute backfitting or violate issue finality.

9 NRC STAFF OBSERVATIONS ON STAKEHOLDER FEEDBACK ON THE DRAFT REGULATORY BASIS

9.1 Feedback from Public Meeting

The NRC staff held a Category 3 public meeting on May 8-10, 2017, to discuss the draft regulatory basis (ADAMS Accession No. ML17047A413) and the associated draft regulatory analysis (ADAMS Accession No. ML16271A511). The purpose of the meeting was to enhance stakeholders' understanding of the two documents to inform development of public comment submissions. Associated with the Appendix A session of the public meeting, a meeting participant posed a question about the requirement for allowable mitigation time. The NRC staff explained that the timeframe was based on guidance established in an NEI document, and was not explicitly described in the regulatory basis. The intent of the regulatory basis is to ensure that excessive time does not lapse before licensees initiate mitigation actions.

9.2 Main Themes from Public Comment Submittals

The NRC received 40 separate comment submittals containing 205 comments on EP. Six comment submittals accounted for 150 of the comments. The staff categorized the various comments as follows: 54 comments were highly favorable to the draft regulatory basis, 67 comments were favorable and provided additional considerations, and 84 comments were opposed to changes in the existing paradigm.

During the review and analysis of the comment submittals, the NRC staff noted that no comments posed a significant challenge to the technical basis. However, some commenters opposed a reduction in offsite radiological EP requirements until all spent fuel is in dry cask storage. Several comments reflected concern with the reduction of offsite radiological EP.

A few commenters argued that ISFSI emergency plans should align to current ISFSI EP requirements.

The NRC staff revised the draft regulatory basis to address many of the comments. In particular, the staff strengthened the overall basis by adding discussions on defense-in-depth, offsite radiological EP programs, and the planning basis from NUREG-0396. Additionally, the regulatory basis needed to clarify that EP is risk-informed, not risk-based.

10 STAFF RECOMMENDATION

The NRC staff recommends amending the regulations to provide a graded approach to EP (Option 2). Additionally, the NRC staff proposes to pursue Option 2 for the emergency plan change process to transition between the EP levels. This option provides a regulatory process for licensees to make changes to their emergency plan to comply with the EP requirements corresponding to the level of decommissioning while minimizing the need for licensees to request license amendments.

APPENDIX B
PHYSICAL SECURITY

CONTENTS

1 INTRODUCTION

The U.S. Nuclear Regulatory Commission's (NRC's) regulations governing physical security requirements applicable to a nuclear power reactor typically do not distinguish between an operating power reactor and a power reactor that is in a decommissioning status. Licensees have sought NRC approval of exemptions to reduce physical security requirements for permanently shutdown reactors because the security risk profile presented by a decommissioning plant is much less than when it was operating. This appendix discusses options to allow licensees to make changes to their physical security plans without requesting exemptions or license amendments as long as the changes do not decrease the effectiveness of the licensees security plans.

2 EXISTING REGULATORY FRAMEWORK

Whether they hold a license under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," or 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," 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, "General Criteria for Security Personnel," and Appendix C, "Safeguards Contingency Plans," to 10 CFR Part 73; 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 facility has an associated independent spent fuel storage installation (ISFSI) under a 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 § 72.210."

In the wake of the terrorist attacks of September 11, 2001, the NRC took several actions to further reduce the possibility of a radiological event. The NRC issued immediately effective, nonpublic orders (the cover letter is available under Agencywide Documents Access and Management System (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 a spent fuel pool (SFP) accident resulting from a terrorist-initiated event. The NRC's regulatory actions after the terrorist attacks of September 11, 2001, have significantly enhanced the safety and security of power reactors. A February 4, 2010 staff 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," (ADAMS Accession No. ML092990438), provides a comprehensive discussion of these activities.

Generally, the power reactor physical security requirements in 10 CFR 73.55 and the NRC's security orders that apply to licensees of operating nuclear power reactors also apply to decommissioning power reactor licensees. Although a licensee may have permanently ceased operating and removed all fuel from its reactor vessel, this does not terminate its 10 CFR Part 50 license or provide relief from security requirements or security orders.

Under the existing regulations, each nuclear power reactor licensed under 10 CFR Part 50 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 cybersecurity 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 provide defense in depth through the integration of systems, technologies, programs, equipment, supporting processes, and implementing procedures to ensure the program's continued effectiveness.

For an operating nuclear power reactor, the possible adversary scenarios cover a wide range of targets and locations and therefore require a complex security strategy that protects plant equipment at several locations throughout a facility. This contrasts with a permanently shutdown and defueled reactor that has irradiated fuel in the SFP or an ISFSI, or both, where adversary scenarios are generally less complex and cover fewer target locations. At a decommissioning power plant, the targets to be protected are significantly reduced in number from when the plant was operating. Therefore, in contrast to an operating reactor, fewer security resources are needed to maintain an equivalent level of protection against radiological sabotage at a decommissioning reactor.

3 TECHNICAL BASIS FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

In the 1996 final decommissioning rule, the NRC noted 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. Additionally, because the reactor core at a decommissioning power reactor has no fuel, both the radiological consequences and number of target sets at decommissioning power reactors are reduced. As discussed in Section 2.2 of this regulatory basis, once a nuclear power reactor has permanently ceased operations, has removed all the fuel from the reactor vessel, and is undergoing decommissioning, there can be no risk of core damage. Therefore, many of the security strategies implemented through an operating reactor licensee's security plans have no or limited applicability to a decommissioning reactor. However, the NRC has no efficient regulatory mechanism to address the reduced security risk associated with decommissioning nuclear power reactors and appropriately adjusting the security requirements. The recommended regulatory changes discussed in this appendix take into account this reduction in radiological sabotage risk at a decommissioning or fully decommissioned reactor.

Decommissioning power reactor licensees and the NRC staff expend substantial resources processing security-related licensing actions, such as requests for exemptions, license amendments, and relief from orders, during the transition period to decommissioning status. Consistent with the power reactors that permanently shut down in the 1990s, licensees that have recently transitioned to decommissioning have redesigned their security strategies to address the lower overall consequences of an offsite radiological release when fuel has been permanently removed from the reactor vessel. The current regulatory process of exemption and license amendment approval is not an efficient use of NRC staff resources to adjust requirements for decommissioning reactors, and it introduces a significant regulatory burden to licensees. This rulemaking is intended to streamline the decommissioning process by incorporating into the regulations those adjustments to security requirements for decommissioning reactors that licensees have commonly requested and that may be generically applied to reduce the burden to both licensees and the NRC.

All reactor licensees have several options when it comes to making changes to the site security plans required under 10 CFR 50.34, “Contents of applications; Technical information.” One of the most commonly used methods for security plan changes is 10 CFR 50.54(p)(2), which allows licensees to make changes to their security plans without prior NRC approval as long as the changes do not decrease the safeguards effectiveness of the plans. Licensees are required to provide a report to the NRC of any change made under 10 CFR 50.54(p)(2) within 2 months of making the change. Licensees spend significant resources ensuring changes do not decrease safeguards effectiveness and preparing and submitting security plan change reports. The NRC staff also reviews these reports as part of routine oversight activities to verify that the changes do not reflect a decrease in effectiveness. Current regulations do not provide a definition for “decrease in effectiveness” and do not address how licensees may demonstrate that there is no such decrease. Therefore, the NRC staff is proposing to add language to the current provisions of 10 CFR 50.54(p) to provide clarity for both licensees and the NRC staff.

The NRC staff is also recommending amending certain physical security requirements to allow for a stepdown in security during decommissioning commensurate with the decreased risk associated with cessation of reactor operations and the placement of all fuel in a dry cask storage system.

4 RULEMAKING OPTIONS

4.1 Option 1: No Action

4.1.1 Description of Option 1

This “no-action” option would retain the current physical security regulatory structure for power reactor licensees during operation and decommissioning. Under this alternative, the NRC would continue to process requests from licensees undergoing decommissioning for exemptions from certain requirements and license amendments for the security commitments in existing license conditions.

4.1.2 Assessment of Option 1

The “no-action” option would retain the current physical security provisions in 10 CFR Part 73. Because certain operating reactor physical security requirements impose unnecessary regulatory burden on licensees undergoing decommissioning, licensees generally request regulatory exemptions or license amendments. The NRC staff uses NSIR/DPR-ISG-03, “Interim Staff Guidance on Review of Security Exemptions/License Amendment Requests for Decommissioning Nuclear Power Plants,” dated September 28, 2015, to review licensee exemption and amendment requests. Under this review process, exemptions and amendments to physical requirements are supported by a site-specific analysis that demonstrates that the effectiveness of the physical protection program has been maintained. Under this alternative, licensees would continue to prepare site-specific analyses of their exemptions and amendments, and the NRC would continue to review these applications from licensees undergoing decommissioning for exemptions from certain requirements and amendments to the security commitments in their existing license. Option 1 would not relieve the burden imposed on both licensees and the NRC resulting from the case-by-case exemption process. In addition, although the exemption process could be further enhanced, this process would not result in the gains in efficiency that are possible through Option 2. By continuing to assess security

exemptions on an individual licensee basis, licensees and the NRC would continue to expend resources on preparing and processing license amendment and exemption requests.

4.2 Option 2: Rulemaking

4.2.1 Description of Option 2

Option 2 would streamline the decommissioning process by allowing licensees to make changes to NRC security requirements during decommissioning that reflect the reduced number of target sets and therefore a reduction in both risk and potential radiological consequences, without having to request either an exemption or amendment. These changes include those commonly requested exemptions and amendments made by decommissioning licensees and typically approved by the NRC. The NRC staff recommends Option 2 and notes that this option has the added benefit of reducing both licensee and NRC resource expenditures.

Under this option, 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. The security inspection program examines a licensee's activities in order to assess performance and to ensure that the licensee's overall security program is meeting the objective of providing high assurance of adequate protection[13] against the DBT. The NRC inspects the following attributes of licensees' security programs for decommissioning power reactors: (1) access authorization, (2) access control, (3) equipment performance, testing, and maintenance, (4) protective strategy evaluation, (5) protection of Safeguards Information, (6) security training, and (7) target sets.

As discussed in Section 2.2 of this regulatory basis, the risk of offsite consequences is reduced at a decommissioning reactor when compared to that at an operating reactor. Given the reduced risk of offsite consequences, the NRC staff has concluded that existing security requirements can be stepped down commensurate with the reduced level of risk. As demonstrated in a June 2003 technical report from Sandia National Laboratories,[14] results of the various calculations evaluating SFP accident scenarios establish that once irradiated fuel has been moved from the reactor vessel to the SFP, potential consequences of a radiological release are significantly reduced. These reduced consequences and the removal of the reactor vessel as a target for radiological sabotage permit reductions in the onsite physical security program. However, licensees are still required to maintain an onsite security organization, physical security plan, and response capability, including coordination with local government officials for onsite response commensurate with the remaining site target sets and potential radiological consequences.

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13 In SRM-SECY-16-0073, "Staff Requirements—SECY-16-0073—Options and Recommendations for the Force-on-Force Inspection Program in Response to SRM-SECY-14-0088," dated October 5, 2016 (ADAMS Accession No. ML16279A345), the Commission directed the staff that, "[i]n implementing the NRC's regulatory program, either in developing new regulations, inspecting licensee compliance with regulations, or executing the FOF program, the staff should be mindful that the concept of 'high assurance' of adequate protection found in our security regulations is equivalent to 'reasonable assurance' when it comes to determining what level of regulation is appropriate."

14 Sandia National Laboratories, SANDIA Report No. MELCOR 1.8.5, Revision 0, "Separate Effect Analyses of Spent Fuel Pool Assembly Accident Response," draft completed June 2003.

In implementing these proposed changes, the NRC would continue its focus on providing assurance of adequate protection against the threat of radiological sabotage and adequate protection of public health and safety from any security event involving fuel stored in the SFP and a dry cask storage system.

This rulemaking option is informed by precedent from earlier decommissioning rulemakings; the statements of consideration (SOCs) that accompanied those rulemakings, specifically, the 1988 rulemaking and 1996 rulemaking as discussed in Section 2.1 of this regulatory basis; and the following NUREGs, regulatory guides, Commission papers, and associated staff requirements memoranda (SRMs):

- Regulatory Guide 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas," issued May 1980 (ADAMS Accession No. ML003739976)
- NUREG/CR-3330, "Vulnerability of Nuclear Power Plant Structures to Large External Fires," issued August 1983 (ADAMS Accession No. ML062260290)
- Regulatory Guide 5.68, "Protection against Malevolent Use of Vehicles at Nuclear Power Plants," issued August 1994 (ADAMS Accession No. ML003739379)
- NUREG-1619, "Standard Review Plan for Physical Protection Plans for the Independent Storage of Spent Fuel and High-Level Radioactive Waste," issued July 1998 (ADAMS Accession No. ML020720453)
- NUREG-1628, "Staff Responses to Frequently Asked Questions Concerning Decommissioning of Nuclear Power Plants," issued June 2000 (ADAMS Accession No. ML003726190)
- SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," dated June 28, 2000 (ADAMS Accession No. ML003721626)
- NUREG -1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," issued February 2001 (ADAMS Accession No. ML010430066)
- Order EA-02-026, "Interim Safeguards and Security Compensatory Measures," dated February 25, 2002 (ADAMS Accession No. ML021350569 (not publicly available))
- "Power Reactor Security Requirements; Final rule," RIN: 3150-AG63, Volume 74 of the *Federal Register* (FR), page 13926 (74 FR 13926; March 27, 2009
- Regulatory Guide 5.75, "Training and Qualification of Security Personnel at Nuclear Power Reactor Facilities," issued July 2009 (ADAMS Accession No. ML091690037)
- SECY-13-0112, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark 1 Boiling-Water Reactor," dated October 9, 2013 (ADAMS Accession No. ML13256A339)
- COMSECY-14-0015, "Security Inspections at U.S. Nuclear Regulatory Commission Decommissioning Power Reactors," dated April 23, 2014 (ADAMS Accession No. ML13347B178)
- SRM-COMSECY-14-0015, "Staff Requirements—COMSECY-14-0015—Security Inspections at U.S. Nuclear Regulatory Commission Decommissioning Power Reactors," dated May 28, 2014 (ADAMS Accession No. ML14148A010)

- SECY-14-0118, “Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements,” dated October 29, 2014 (ADAMS Accession No. ML14219A444)
- SRM-SECY-14-0118, “Staff Requirements—SECY-14-0118—Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements,” dated December 30, 2014 (ADAMS Accession No. ML14364A1116)
- NSIR/DSP-ISG-03, “Interim Staff Guidance on Review of Security Exemptions/License Amendment Requests for Decommissioning Nuclear Power Plants,” dated September 28, 2015 (ADAMS Accession No. ML15106A737)

4.2.2 Assessment of Option 2

Under this option, the NRC staff would pursue rulemaking to implement appropriate changes to the physical security requirements that would apply to decommissioning power reactors. Once a licensee certifies under 10 CFR 50.82, “Termination of license,” that it has (1) permanently ceased operations and (2) permanently removed fuel from the reactor vessel, and once the NRC has docketed these certifications, changes to the operations of the plant may support a step down in the physical security requirements currently imposed on operating reactors through regulations and orders.

This option would reduce the need to use the license exemption process or the license amendment process, or both, which would significantly reduce the administrative burden to licensees and the NRC staff associated with the processing of exemptions and license amendments. Overall, the rule would provide ongoing cost savings to licensees and moderate one-time costs followed by ongoing cost savings to the NRC. Option 2 would result in reduced ongoing costs associated with the submission by licensees, and the review by the NRC staff, of security plans throughout the decommissioning process.

5 REGULATORY SCOPE

5.1 NRC-Conducted Force-on-Force Inspections

Section 170D of the Atomic Energy Act of 1954, as amended, mandates NRC-conducted security evaluations, including force-on-force exercises, at certain classes of NRC licensees. The NRC conducts these evaluations at two classes of licensed facilities: (1) operating power reactors and (2) Category I fuel cycle facilities. The current security inspection program for decommissioning power reactors does not include an NRC-conducted force-on-force inspection.

In COMSECY-14-0015, the NRC staff informed the Commission of its intended approach for security inspections at decommissioning power reactors. The NRC staff concluded in COMSECY-14-0015 that NRC-conducted force-on-force inspections during decommissioning are not warranted because the current security inspection program provides adequate oversight and verification of the security posture given the reduction in both radiological consequences and the number of target sets at decommissioning power reactors. In SRM-COMSECY-14-0015, the Commission agreed with the NRC staff’s conclusion that NRC-conducted force-on-force inspections during decommissioning are not warranted. The NRC has not published regulations that implement the statutory requirement to conduct security evaluations, including force-on-force exercises. Therefore, once licensees have filed, and the NRC has docketed, the certifications of permanent cessation of operations and permanent

removal of fuel from the reactor vessel under 10 CFR 50.82 or 10 CFR 52.110, "Termination of license," the NRC will notify licensees by letter that they are no longer subject to NRC-conducted force-on-force inspections. Internal licensing guidance will reflect this update. The NRC staff is not recommending any changes to the regulations for this issue.

5.2 Suspension of Security Measures

The NRC staff is proposing to amend 10 CFR 73.55(p) to permit a certified fuel handler (CFH), as defined in 10 CFR 50.2, "Definitions," to approve the temporary 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 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 security personnel in the instance of severe weather could be accomplished at a decommissioning reactor without first requesting an exemption.

Certain provisions of NRC regulations allow for a CFH to perform actions that would otherwise need to be performed by a licensed senior operator. Nuclear power reactor licensees under the provisions of 10 CFR 50.54(x) may take reasonable actions that depart from a license condition or a technical specification in an emergency when this action is immediately needed to protect its staff and the public and when no action consistent with existing conditions or specifications is immediately apparent. In accordance with the provisions of 10 CFR 50.54(y), licensee actions permitted by 10 CFR 50.54(x) must be approved (as a minimum) by a licensed senior operator or, at a decommissioning nuclear power reactor after submittal of the certifications required under 10 CFR 50.82(a)(1), by either a licensed senior operator or a certified fuel handler, before taking the action. Thus, changing the requirements in 10 CFR 73.55(p)(1)(i)–(ii) will also make them consistent with the provisions of 10 CFR 50.54(x) and (y).

In related actions, licensees have been requesting amendments to their technical specifications to eliminate the need to maintain licensed operators on the staff. Furthermore, decommissioning plants are discontinuing the associated licensed operator training programs. In place of the licensed operators, decommissioning plant licensees have required the presence of a CFH (i.e., a nonlicensed operator (NLO) who has qualified in accordance with a fuel handler training program approved by the Commission) and an additional NLO as the minimum staffing for each shift. 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 public health and safety.

Adding the CFH and giving him or her the authority to approve the suspension of security measures during emergencies or severe weather will not endanger life or property or the common defense and security. By regulatory definition in 10 CFR 50.2, a "certified fuel handler"[15] means (for a nuclear power reactor facility) an NLO who has qualified in accordance with a fuel handler training program approved by the Commission. Given the reduced nature of the risks at a permanently shutdown and defueled nuclear power reactor, the NRC staff has determined that a CFH has the requisite knowledge and experience to evaluate site conditions and make the types of judgments necessary to determine that the suspension of security measures during safety events is warranted. The NRC staff based this determination on the Commission's approval of licensee fuel handler training programs suitable to qualify a CFH (ADAMS Accession Nos. ML14104A046 and ML13268A165), which include three broad-scope objectives as criteria for determining the acceptability of such programs, including training on the appropriate response to plant emergencies. Further, 10 CFR 73.55(p)(2) would continue to state that "suspended security measures must be reinstated as soon as conditions permit." The underlying purpose of 10 CFR 73.55(p) is to protect the health and safety of the public and the security force, and this purpose will continue to be met. During security-related emergencies, security personnel coordinate with the CFH to implement the security measures outlined in the site safeguards contingency plan, which interfaces with the site emergency plan.

For these reasons, the NRC staff recommends that the requirements in 10 CFR 73.55(p) reflect the following changes (note that the *italicized* text is new):

> (i) In accordance with §§ 50.54(x) and 50.54(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, at a nuclear power reactor facility for which the certifications required under § 50.82 or § 52.110 have been docketed, 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, at a nuclear power reactor facility for which the certifications required under § 50.82 or § 52.110 have been docketed, by either a licensed senior operator or a certified fuel handler,* with input from the security supervisor or manager, before taking this action.

[15] The NRC staff is recommending to revise this definition and the requirements for CFH training as part of this rulemaking effort. These changes appear in Appendix E of this document and include the establishment of optional requirements for minimum staffing levels of NLOs and CFHs for decommissioning reactors and a training program that addresses the safe conduct of decommissioning activities, safe handling and storage of spent fuel, and appropriate response to plant emergencies.

5.3 Protection Against 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 since 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 dry cask storage system. Training of security personnel for this condition is also no longer warranted.

Therefore, the NRC staff is proposing to relieve licensees of a nuclear power reactor in decommissioning from the requirement in 10 CFR 73.55(b)(3) that the physical protection program must be designed to prevent significant core damage. All other conditions in this regulation would remain in effect.

The current 10 CFR 73.55(b)(3) regulation reads as follows:

> The physical protection program must be designed to prevent significant core damage and spent fuel sabotage. Specifically, the program must: (i) Ensure that the capabilities to detect, assess, interdict, and neutralize threats up to and including the design basis threat of radiological sabotage as stated in § 73.1, are maintained at all times. (ii) Provide defense-in-depth through the integration of systems, technologies, programs, equipment, supporting processes, and implementing procedures as needed to ensure the effectiveness of the physical protection program.

The NRC staff recommends the addition of the following paragraph (iii) to 10 CFR 73.55(b)(3) (note that the *italicized* text is new):

> *(iii) Upon docketing of the certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel pursuant to § 50.82 or § 52.110 of this chapter, the requirement that the physical protection program be designed to prevent significant core damage no longer applies.*

5.4 Training for Loss of the Ultimate Heat Sink

Section B.1.a of Security Order EA-02-026 (not publicly available) requires licensees to provide operational training for emergency response actions in the event of the loss of the ultimate heat sink for an operating reactor. The ultimate heat sink is the system of structures and components and associated assured water supply and atmospheric condition(s) credited for functioning as a heat sink to absorb reactor residual heat and essential station heat loads after a normal reactor shutdown or a shutdown following an accident or transient, including a loss-of-coolant accident. The operational training required in Security Order EA-02-026 addresses loss of the ultimate heat sink necessary for an emergency reactor shutdown to protect against reactor core damage and a radiological release.

A nuclear power reactor that has permanently ceased operations and no longer has fuel in the reactor vessel would not undergo an emergency shutdown to prevent core damage or a radiological release. This means that the ultimate heat sink is no longer necessary once all fuel

is in the SFP or in a dry cask storage system and that any operational training to address loss of the ultimate heat sink is no longer necessary. Consequently, the security order requirement for operational training for this condition is no longer necessary.

Therefore, the NRC staff is proposing to provide licensees with a nuclear power reactor in decommissioning status with relief from the requirement in Section B.1.a of Security Order EA-02-026. All other conditions in this order would remain in effect.

The NRC will notify licensees by letter upon docketing the certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel under 10 CFR 50.82 or 10 CFR 52.110 that the requirement to implement Section B.1.a of Security Order EA-02-026 is rescinded in its entirety. The NRC staff is not recommending any changes to the regulations for this issue.

5.5 Protection of the Control Room

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 that 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 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, 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 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. 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. If this is the case, the licensee no longer needs to designate the reactor control room as a vital area.

The NRC staff recommends the addition of the following to 10 CFR 73.55(e)(9)(v)(A) (note that the *italicized* text is new):

> At a minimum, the following shall be considered vital areas: (A) the reactor control room*, unless the licensee has submitted, and the NRC has docketed, the certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel pursuant to § 50.82(a) or § 52.110(a) of this chapter and the licensee has certified that all vital equipment has been removed from the control room and does not serve as the vital area boundary for other vital areas.*

5.6 Communications with the Control Room

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 both 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 a control room; therefore, the NRC staff is recommending replacing the requirement for maintaining continuous communications between the alarm stations and the control room with a requirement for maintaining communications between the alarm stations and the CFH or senior onshift licensee representative, or both. This change would ensure that a decommissioning facility maintains communications between safety and security functions.

Communication requirements will continue to meet the following conditions:

- The licensee shall establish and maintain continuous communication capability with onsite and offsite resources to ensure effective command and control during both normal and emergency situations (10 CFR 73.55(j)(1)).

- The licensee shall establish and maintain radio or microwave transmitted two-way voice communication, in addition to conventional telephone service, between the alarm stations and local law enforcement authorities. (10 CFR 73.55(j)(4)(i)).

- The licensee shall identify site areas in which communication could be interrupted or cannot be maintained and shall establish alternative communication measures or otherwise account for these areas in implementing procedures (10 CFR 73.55(j)(6)).

The NRC staff recommends the addition of the following language to 10 CFR 73.55(j)(4) (note that the *italicized* text is new):

> (ii) A system for communication with the control room *or, if the certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel have been docketed pursuant to § 50.82 or § 52.110 of this chapter, a system for communication with the certified fuel handler and/or senior onshift licensee representative responsible for the overall safety and security of the permanently shutdown and defueled facility.*

5.7 Number of Armed Responders

In accordance with 10 CFR 73.55(k), licensees must establish and maintain at all times properly trained, qualified, and equipped personnel required to interdict and neutralize threats up to and including the DBT of radiological sabotage as defined in 10 CFR 73.1. Under 10 CFR 73.55(k)(5), NRC licensees are responsible for determining the minimum number of armed responders necessary to satisfy the general performance objective and requirements in 10 CFR 73.55(b) and to document this number in their security plans. The regulations also provide that the licensee have at least 10 armed responders within a protected area at all times for reactors. This number of armed responders ensures that a portion of the armed personnel at each site are available at all times to respond to a wide variety of contingency events that are outlined in the safeguards contingency plan (SCP) that are not specifically tailored to target sets. During decommissioning,

the adversary characteristics and the contingency events outlined in the SCP do not change to meet the performance objective for preventing spent fuel sabotage as outlined in 10 CFR 73.55(b)(3). The minimum number of armed responders documented in each physical security plan varies for each site due to site specific conditions (e.g., terrain features, site configuration, and plant design).

As discussed in Section 2.2 of this regulatory basis and in Section 5.3 of this appendix, reactors that have ceased to operate and have removed all fuel from the reactor vessel have a lower risk of significant radiological release as a result of a security event. However, 10 CFR 73.55(k), like many security regulations applicable to operating reactors, does not take into account this lower risk and its corresponding reduction in the number of target sets requiring protection as facilities defuel and progress through the decommissioning process. Upon cessation of operations and removal of all fuel from the reactor vessel, each facility reduces or eliminates safety systems related to the reactor that were classified as target sets (e.g., emergency core cooling systems) and eliminates all attack scenarios relating to core damage. Commensurate with this reduction in potential targets, the NRC staff recognizes that a licensee is permitted to reassess the minimum number of armed responders needed to implement the site protective strategy consistent with the performance objectives and design requirements in 10 CFR 73.55(b) to prevent the design basis threat of radiological sabotage. Operating and decommissioned reactors may reduce target sets which may result in a reassessment of the minimum number of armed responders. Therefore, the NRC staff has concluded that given the variety of site specific conditions for each site, licensees may continue to use existing processes to reassess the minimum number of armed responders for their facilities. In both cases, If the minimum number of armed responder is less than (10), the licensee would submit this reassessment to the NRC for review and approval in accordance with 10 CFR 50.90, “Application for amendment of license, construction permit, or early site permit,” and must demonstrate how the physical protection program continues to prevent radiological sabotage to ensure that each site has the appropriate number of armed responders needed to maintain safeguards effectiveness with assurance. Therefore, the NRC staff recommends no change to the current regulations since existing regulatory processes are sufficient to address this issue.

5.8 Safeguards Effectiveness

All reactor licensees have several options for making changes to the site security plans required under 10 CFR 50.34. Consistent with 10 CFR 50.54(p)(1), licensees must submit a license amendment request under 10 CFR 50.90 for any change that decreases the effectiveness of their security plans. The license amendment request must fully describe the proposed change and the technical basis for the change. The license amendment request is subject to NRC review and approval. Consistent with 10 CFR 50.54(p)(2), licensees may make changes to their security plans without prior Commission approval if the change does not decrease the safeguards effectiveness of the plan. Licensees are required to provide a report of the changes to the Commission within 2 months following the change. Finally, licensees may request specific exemptions from security requirements in accordance with 10 CFR 73.5, “Specific exemptions.” Specific exemptions may address, among other things, changes in site conditions arising from decommissioning. The NRC must review and approve all exemptions before licensees can implement the changes.

Upon the cessation of operations and removal of all fuel from the reactor vessel, licensees that are performing decommissioning activities may want to modify their physical protection programs to reflect changes in site conditions, including but not limited to (1) changes to vital

areas as defined in 10 CFR 73.2, “Definitions,” (2) the reduced number of target sets, (3) the number of armed personnel necessary to protect the nuclear materials possessed at the facility, and (4) the location of physical barriers required under 10 CFR 73.55.

Operating reactor licensees that are in decommissioning status currently use the 10 CFR 50.54(p)(2) process to implement changes to their site security plans (e.g., removal of barriers, reduction of vital areas and armed response team members). After the licensee has implemented the changes to its security plans and submitted the required report of the changes, the NRC staff reviews these reports to ensure that the licensee has properly adhered to the requirements of 10 CFR 50.54(p)(2) and has not implemented a change that decreases the safeguards effectiveness of its security plans. Licensees have typically described these changes in their submitted reports and provided additional information to demonstrate that such changes do not constitute a decrease in safeguards effectiveness. The NRC staff is able to complete these reviews and make a safeguards effectiveness determination based on the additional information included in these licensee reports. Without the submittal of this additional information, the NRC staff would not be able to verify a licensee’s safeguards effectiveness determination through a review of the report alone and could only complete this verification through inspection.

The NRC staff further notes that the 10 CFR 50.54(p)(2) change process is complicated for both licensees and the NRC staff because the regulations do not define the term “decrease in safeguard effectiveness.” This contrasts with the treatment of emergency plans in 10 CFR 50.54(q), which does define the similar concept of “reduction in effectiveness.” Accordingly, the NRC is recommending the addition of the following definition to 10 CFR 50.2 or 10 CFR 50.54(p)(2) (note that the *italicized* text is new):

> ***Safeguards Effectiveness****—A decrease in the safeguards effectiveness of a security plan is a change or series of changes to the security plan that reduces or eliminates the licensee’s ability to perform or maintain the security capability that was previously performed or provided by the changed element or component without compensating changes to other security plan elements or components.*

Additionally, in a *Federal Register* notice regarding the draft regulatory basis (82 FR 21481; May 9, 2017) (ADAMS Accession No. ML16271A355) published for public comment, the NRC staff specifically asked for comments on the following alternatives to ensure that it received complete information on requested security plan changes:

- Alternative 1, no change. Decommissioning licensees continue to implement security plan changes that do not decrease safeguards effectiveness, using the provisions of 10 CFR 50.54(p)(2) and reporting changes to the NRC within 2 months. If the NRC staff is unable to verify the licensee’s safeguards effectiveness determination through a review of the submitted report, the NRC staff would continue to follow up on the changes through the inspection process.

- Alternative 2. The NRC would develop regulatory guidance associated with changes to decommissioning reactor security plans to provide licensees guidance for making security plan changes that do and do not decrease the safeguards effectiveness of the plan.

- Alternative 3. The NRC would revise the requirements in 10 CFR 50.54(p) to include the aforementioned definition of safeguards effectiveness and would revise the specific

requirements in 10 CFR 50.54(p)(2) to more closely reflect the wording found in 10 CFR 50.54(q), specifically the wording in 10 CFR 50.54(q)(3) and (5).

Based on public comments, the staff is recommending Alternative 3. Consistent with Alternative 3, the NRC staff recommends the addition of the following language in 10 CFR 50.54, "Conditions of Licenses," to effect this change (note that the *italicized* text is new):

> (p)(2) The licensee may make changes to the plans referenced in paragraph (p)(1) of this section, without prior Commission approval if the changes do not decrease the safeguards effectiveness of the plan. The licensee shall maintain a record of each security plan change 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 or § 52.3 of this chapter, a report containing a description of each change within 2 months after the change is made. *Once the NRC has docketed a licensee's submissions of certification of permanent cessation of operations and permanent removal of fuel from the reactor vessel pursuant to § 50.82 or § 52.110 of this chapter, the licensee shall describe the changes made to the security plan in the required report and include a summary of the analysis completed to determine that safeguard effectiveness has been maintained.*

5.9 Transition to Physical Security Requirements Applicable to an Independent Spent Fuel Storage Installation

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), generally licensed 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, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste," are subject to the physical security requirements in 10 CFR 73.51, "Requirements for the physical protection of stored 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 licensed ISFSI will progress to a phase when all the spent fuel has been removed from the SFP and placed in a dry cask storage system. 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 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 dry cask storage systemfrom 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 staff is recommending changes to 10 CFR Part 72 and 10 CFR Part 73 to transition a general licensed ISFSI to the requirements in 10 CFR 73.51 when the power reactor facility enters decommissioning status.

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

The NRC will not create any new physical security guidance in support of this rulemaking. Current security guidance supports the development and implementation of physical security plans without regard to the specific status of the facility. The NRC staff will update the existing guidance documents that are affected by this rulemaking on their regularly scheduled basis.

7 IMPACTS ON PUBLIC HEALTH, SAFETY, AND SECURITY

7.1 Option 1: No Action

7.1.1 Impacts on Public Health, Safety, and Security

Because this option would not change the current process, there would be no increase or reduction in public health, safety, and security.

7.1.2 Impacts on Licensees

This option would have no incremental impact on licensees.

7.1.3 Impacts on the NRC

This option would have no incremental impact on the NRC.

7.1.4 Additional Considerations

This option would have no incremental impact on State, local, or Tribal governments.

7.1.5 Summary of Benefits and Costs

There would be no incremental benefits or costs to licensees or the NRC.

7.2 Option 2: Rulemaking

7.2.1 Impacts on Public Health, Safety, and Security

These changes would reflect exemptions and amendments that have been granted by the NRC under the current process. The NRC staff's evaluation of all security plan changes to ensure that the site security effectiveness does not decrease as a result would continue to occur under 10 CFR 50.54(p). The NRC staff concludes that changes to the regulations would capture the areas from which licensees currently request relief; therefore, there would be no reduction in public health, safety, or security, while providing the public a level of clarity in the execution of the process.

7.2.2 Impacts on Licensees

Overall, this option would result in ongoing cost savings to licensees:

- Changes to the requirements would result in fewer exemption requests and license amendment requests for decommissioning reactors. Licensees would benefit from a reduction in the administrative burden associated with the exemption request and license amendment request process. Licensees may also be able to expedite the decommissioning process because any delays associated with processing exemptions and amendments would be reduced.

- Licensees would continue to incur moderate administrative burden associated with submitting updated physical security plans to the NRC as they transition from an operating status to a decommissioned status and then to an ISFSI.

7.2.3 Impacts on the NRC

Overall, this option would result in significant one-time costs to the NRC followed by ongoing savings:

- Initially, the NRC would incur incremental costs to undertake the rulemaking process for this portion of the power reactor decommissioning rulemaking concurrently with processing exemption requests. These costs include the preparation of the proposed rule and accompanying guidance. The costs would include both the NRC staff and contractor time to prepare proposed rule language, draft guidance, supporting analyses (e.g., a regulatory analysis and Office of Management and Budget paperwork burden analysis), and a *Federal Register* notice, and public outreach efforts during the rule and guidance development phase. After publishing the proposed rule, the NRC would incur costs associated with public comment resolution and preparation of the final rule, guidance, and supporting documentation for the rulemaking.

- By streamlining the decommissioning exemption and amendment process, the NRC will reduce both the number and length of the requests. This would result in a more efficient process and save the NRC staff time and resources.

- The NRC staff would incur administrative burden associated with reviewing updated physical security plans for decommissioning reactors that are transitioning between tiers.

7.2.4 Additional Considerations

The proposed rule would have no incremental impact on State, local, or Tribal governments.

7.2.5 Summary of Benefits and Costs

<u>Benefits</u>

- enhanced clarity and predictability of decommissioning process
- savings to licensees resulting from minimizing the need to use the exemption and amendment process
- savings to licensees resulting from a potential to expedite the decommissioning process
- savings to the NRC from fewer amendments and exemptions to review

Costs

- a one-time cost to the NRC to prepare the rule, revise guidance, and implement the rule
- ongoing costs to licensees to provide updates to physical security plans during the process
- ongoing costs to the NRC to review updates to physical security plans during the process

8 BACKFIT AND ISSUE FINALITY CONSIDERATIONS

Neither option presented by the NRC staff in this appendix would constitute backfitting under 10 CFR 50.109, "Backfitting," or violate any issue finality provision in 10 CFR Part 52 if the NRC implemented the option. Option 1 would maintain the status quo of exemption requests, license amendment requests, and changes under 10 CFR 50.54(p), thereby imposing no change in requirements or the NRC staff's positions. The recommendations in Option 2, if implemented, would provide licensees with a voluntary alternative to exemption requests, license amendment requests, and changes under 10 CFR 50.54(p) by amending NRC regulations to establish a graded approach to physical security commensurate with the reductions in radiological risk as licensees proceed through the decommissioning process. Because the NRC would not require licensees to comply with these regulations, their inclusion in the rulemaking for Option 2 would not constitute backfitting or violate issue finality.

The proposed requirement that licensees prepare and retain an analysis of security plan changes made under 10 CFR 50.54(p)(2) and submit a summary of that analysis to the NRC would be a new information collection and reporting requirement. Information collection and reporting do not fall within the purview of backfitting provisions.

9 NRC OBSERVATIONS ON STAKEHOLDER FEEDBACK ON THE DRAFT REGULATORY BASIS

9.1 Feedback from the Public Meeting

The NRC received a few questions at the May 8, 2017, public meeting about physical security in general and answered those questions during the meeting.

9.2 Main Themes from Public Comment Submittals

Overall, comments received on the planned regulatory improvements in the area of physical security are supportive of the changes. The NRC staff received comments from private citizens, local and State governments, public interest groups, industry and industry groups, and nongovernmental organizations. The NRC staff used the comments received to inform this regulatory basis but did not disposition comments individually.

Comments could be grouped into two categories: (1) those that supported reasonable changes based on security event consequences and (2) those that supported no change or an increase in requirements based on a perceived vulnerability or increased risk. The NRC staff reviewed and considered all comments and made changes to this document based on some of the comments submitted.

9.2.1 Changes to the Regulation

Specifically, several commenters requested that no changes be made to the current physical security posture at decommissioning reactors as long as spent fuel was still located in the SFP. Other commenters wanted to make sure that the rule did not have negative or unintentional impacts on standalone ISFSIs.

NRC Response

The NRC will keep in place the requirements for licensees to maintain a response force until all fuel has been placed in a dry cask storage system. The NRC recommends that the regulations be changed to ease the transition for decommissioning reactors from the requirements of 10 CFR 73.55 to the requirements of 10 CFR 73.51.

9.2.2 Scope of the Regulatory Change

Some commenters urged the NRC to direct the scope of the rulemaking at codifying the exemptions and other licensing actions that licensees have historically justified and the NRC has approved.

NRC Response

To address this comment, the NRC staff reviewed past exemptions and amendments and included in this regulatory basis all exemptions and amendments that could be generically applied to future decommissioning sites, specifically adding relief from the protection against significant core damage.

9.2.3 Changes to the Number of Armed Responders

One group of commenters requested that the NRC allow licensees to reduce the number of armed responders below 10 without having to request a license amendment.

NRC Response

The NRC staff does not support the suggested change because this particular change would not provide adequate protection against the DBT for radiological sabotage characteristics. The NRC staff discusses the recommendation to reduce the number of armed responders in this regulatory basis to support openness and clarity in regulatory changes.

9.2.4 Spent Fuel Storage Location

Some commenters stated that all spent fuel should be removed from the site immediately and that the onsite storage of spent fuel should not be allowed at any time.

NRC Response

These comments are outside of the scope of this rulemaking; therefore, this regulatory basis does not address them.

10 STAFF RECOMMENDATION

The NRC staff recommends Option 2.

APPENDIX C
CYBER SECURITY

CONTENTS

1 INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) sets forth the current cyber security requirements for power reactors in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 73.54, "Protection of digital computer and communication systems and networks." The NRC established these requirements as part of a 2009 final rule, "Power Reactor Security Requirements" (Volume 74 of the *Federal Register* (FR), page 13926 (74 FR 13926); March 27, 2009). As stated in the rule's *Federal Register* notice, its requirements became effective on May 26, 2009.

As discussed in Section 2.2 of this regulatory basis, the NRC staff recognizes that, in comparison to the risks at an operating nuclear power reactor, the spectrum of possible accidents is significantly smaller and the risk of an offsite radiological release is significantly lower at a nuclear power reactor that has permanently ceased operations and has removed all fuel from the reactor vessel. This reduced cyber security risk is a result, in part, of the fact that there are fewer critical digital assets (CDAs) at a decommissioning reactor in comparison to the number of CDAs at an operating reactor. For example, once spent fuel is moved from the reactor vessel and placed in the spent fuel pool (SFP), the digital computers and communication systems and networks that require cyber protection are primarily those associated with security of the SFP, emergency preparedness (EP), and those safety systems that support the operation of the SFP. If the NRC staff adopts a graded EP approach, as discussed in Appendix A of this document, systems and supporting equipment associated with EP functions would be removed in phases during power reactor decommissioning. Additionally, the reduction in the number of digital computers and communication systems and networks would reduce the number of attack pathways for a cyber attack during the decommissioning of a power reactor.

2 EXISTING REGULATORY FRAMEWORK

The preamble to 10 CFR 73.54 states, in part, that by November 23, 2009, each nuclear power reactor licensee "currently licensed to operate" must, in accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," submit to the NRC "a cyber security plan" (CSP) for review and approval. The preamble further states that the requirements in 10 CFR 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. As yet, no power reactor facilities are operating under a combined license issued in accordance with 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." The NRC staff, however, has written this appendix assuming that there will be licensees operating under 10 CFR Part 52 licenses in the future, with analogous requirements for cyber security included in conditions in their licenses.

Under 10 CFR 73.54(a), applicants and licensees must provide "high assurance"[16] that their digital computer and communication systems and networks associated with safety and important-to-safety, security, and emergency preparedness (SSEP) functions "are adequately

[16] In SRM-SECY-16-0073, "Staff Requirements—SECY-16-0073—Options and Recommendations for the Force-on-Force Inspection Program in Response to SRM-SECY-14-0088," dated October 5, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16279A345), the Commission directed that, "[i]n implementing the NRC's regulatory program, either in developing new regulations, inspecting licensee compliance with regulations, or executing the FOF program, the staff should be mindful that the concept of 'high assurance' of adequate protection found in our security regulations is equivalent to 'reasonable assurance' when it comes to determining what level of regulation is appropriate."

protected against cyber attacks, up to and including" the design-basis threat described in 10 CFR 73.1, "Purpose and Scope." Nuclear power reactor operating licenses reference approved CSPs as license conditions. These license conditions continue to apply until the license is terminated. As discussed further below, a licensee may apply for a license amendment under 10 CFR 50.90 to remove its CSP license condition (see Section 3.5 of this appendix).

As an initial step in the decommissioning process, a 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 10 CFR 50.82(a)(1)(i) and (ii) for power reactor licensees under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," or 10 CFR 52.110(a)(1) and (2) for 10 CFR Part 52 combined license holders. As stated in 10 CFR 50.82(a)(2) and 10 CFR 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.

3 TECHNICAL BASIS FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

3.1 Proposed Application of Cyber Security Requirements to Decommissioning Reactors

Once the NRC has docketed a licensee's 10 CFR 50.82 or 10 CFR 52.110 certifications, 10 CFR 73.54 no longer applies to that license because the licensee is no longer authorized to operate a nuclear power plant. However, a reactor licensee that has submitted its 10 CFR 50.82(a)(1) or 10 CFR 52.110(a) certifications may still have fresh fuel in its SFP. As discussed in the spent fuel analyses referenced in Section 2.2 and Appendix A of this regulatory basis, the NRC staff has concluded that after a cooling period of 10 months for boiling-water reactors or 16 months for pressurized-water reactors, there is little chance that the spent fuel in the SFP could heat up to clad ignition temperature within 10 hours and lead to a zirconium fire for postulated draindown scenarios and configurations with restricted heat transfer. The NRC staff has further concluded that once the spent fuel has sufficiently decayed, the potential consequences of a cyber attack are significantly reduced, because there are no design-basis events at a decommissioning plant that could result in an offsite radiological release exceeding the limits established by the U.S. Environmental Protection Agency. With the significant reduction in radiological risk for a power reactor undergoing decommissioning, the NRC recognizes that the consequences of a cyber attack are reduced.

Despite the reduction in risk associated with a decommissioning power reactor, the NRC staff has determined that, until all spent fuel in the SFP is sufficiently decayed such that a spent fuel fire is highly unlikely, reactor licensees should be required to maintain reasonable assurance that their CDAs remain protected against cyber attacks. Further, notwithstanding that 10 CFR 73.54 no longer applies once a licensee's 10 CFR 50.82 or 10 CFR 52.110 certifications are docketed, licensees are still subject to their CSP license conditions until they are removed from the license pursuant to a 10 CFR 50.90 amendment request or the license is terminated. Accordingly, licensees that are decommissioning will remain subject to their CSP license conditions absent NRC approval of an amendment request. The NRC is currently following its normal process to evaluate, on a case-by-case basis, any license amendment requests submitted by licensees requesting the removal of these license conditions.

Licensees that are decommissioning may request adjustments to their CSPs to account for the reduced number of CDAs, using the processes under 10 CFR 50.54(p) and 10 CFR 50.90. For example, on October 1, 2015, the NRC staff issued a license amendment (ADAMS Accession No. ML15209A935) for San Onofre Nuclear Generating Station, Units 2 and 3 (SONGS), to revise the CSP completion date in the facility operating licenses, based in part on the fact that the number of CDAs at SONGS was expected to be reduced from 3,350 to approximately 1,350 a result of the decision to decommission Units 2 and 3.

3.2 Reduced Cyber Risks at Spent Fuel Pools No Longer Receiving Fresh Spent Fuel

As discussed more fully in Section 2.2 of this regulatory basis, in the late 1990s, NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," issued February 2001, studied the risk of an SFP accident to support a previous rulemaking on decommissioned nuclear power plants in the United States. NUREG-1738 (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 it 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 reaffirmed the safety and security of spent fuel stored in pools and demonstrated that SFPs are effectively designed to prevent accidents and minimize damage from malevolent attacks.

The NRC staff considers that the consequences resulting from a successful cyber attack at a decommissioning plant are reduced in part because the number of SSEP systems, particularly safety systems, and their corresponding CDAs, is reduced when a reactor enters decommissioning. Accordingly, the NRC staff has determined that once plants have gone through a cooling period of 10 months for boiling-water reactors or 16 months for pressurized-water reactors, (1) there are no applicable design-basis events at these facilities that could result in an offsite radiological release exceeding the limits established by the U.S. Environmental Protection Agency's early phase protective action guidelines of 1 rem at the exclusion area boundary, and (2) sufficient time would exist to take prompt mitigative actions in response to a postulated zirconium fire accident scenario in the SPF. The current 10 CFR 73.54 regulations do not reflect these considerations.

3.3 10 CFR 73.54 Guidance

The NRC issued Regulatory Guide 5.71, "Cyber Security Programs for Nuclear Facilities," in January 2010 (ADAMS Accession No. ML090340159). RG 5.71 provides guidance for the implementation of the cyber security program required by 10 CFR 73.54. The NRC has also endorsed the industry guidance contained in Nuclear Energy Institute (NEI) 08-09, Revision 6, "Cyber Security Plan for Nuclear Power Reactors," issued April 2010 (ADAMS Accession No.

ML101180437), and NEI 13-10, Revision 4, "Cyber Security Control Assessments," issued November 2015 (ADAMS Accession No. ML15338A276).

3.4 Relationship between Decommissioning Power Reactors and Independent Spent Fuel Storage Installations

The NRC staff developed SECY-12-0088, "The Nuclear Regulatory Commission Cyber Security Roadmap," dated June 25, 2012 (ADAMS Accession No. ML12135A050), which set forth the NRC staff's approach for evaluating the need for cyber security requirements for four categories of NRC licensees and facilities: (1) fuel cycle facilities, (2) nonpower reactors, (3) independent spent fuel storage facilities (ISFSIs), and (4) byproduct materials licensees. The roadmap reflects a graded approach to developing cyber security requirements commensurate with the inherent nuclear safety and security risks associated with the different types of licensees and facilities.

Regarding ISFSIs, the NRC staff in SECY-12-0088 (page 6) states in relevant part:

> By regulation [10 CFR Part 72], dry cask storage in ISFSIs allows spent fuel that has already been cooled in the spent fuel pool for 1 year to be surrounded by inert gas inside a storage cask. Licensees that are subject to 10 CFR 72.212, "Conditions of General License Issued Under 10 CFR 72.210," (i.e., licenses limited to storage of spent fuel in casks) must also comply with specific portions of 10 CFR 73.55 requirements for physical security and the ASM [additional security measures] Orders, but are not subject to the provisions of 10 CFR 73.54, which specifically applies to operating reactors and COL [combined license] applicants.

The NRC staff will consider the need for cyber security requirements for ISFSIs as part of a general rulemaking on ISFSI security.

3.5 Recent Licensing Activity

After more than a decade without any power reactors permanently shutting down, operators of six power reactor units have permanently ceased operations since 2013. Several more operators of nuclear power reactors have indicated their intent to decommission in the next few years. Several licensees that are in the decommissioning process have indicated their intent to remove their CSP license conditions, and two such licensees have submitted license amendment requests in this regard. By letter dated October 15, 2015 (ADAMS Accession No. ML15294A072), Dominion Energy Kewaunee, Inc. submitted such a request, asking the NRC to approve the removal of cyber security requirements from its operating license for the Kewaunee Power Station once all spent fuel in its SFP has been moved to its onsite ISFSI. By letter dated May 24, 2016 (ADAMS Accession No. ML16152A045), Duke Energy Florida, LLC, submitted a similar amendment request, seeking the deletion of the cyber security license condition from its license for Crystal River, Unit 3. Both of these license amendment requests have since been approved.

4 RULEMAKING OPTIONS

The NRC staff identified three options (1, 2A, and 2B) to address the issues associated with cyber security requirements for decommissioning power reactors. These options were informed

by stakeholder interaction on the advanced notice of proposed rulemaking for the power reactor decommissioning rulemaking (80 FR 72358; November 19, 2015).

4.1 Option 1: No Action

4.1.1 Description of Option 1

Under the "no-action" option, 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 combined licenses in accordance with 10 CFR 52.79(a)(36)(iii). The introductory wording of 10 CFR 73.54 states that it applies to "each licensee currently licensed to operate a nuclear power plant under Part 50 of this chapter…."[17] 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. This position is further detailed in the December 5, 2016 memo, "Cyber Security Requirements for Decommissioning Nuclear Power Plants" (ADAMS Accession No. ML16172A284).

This conclusion is consistent with the position developed to support the 1996 final decommissioning rule (61 FR 39278; July 29, 1996) establishing the 10 CFR 50.82(a) certification provisions. As stated in the Statement of Considerations for the proposed rule (60 FR 37374, at 37378; July 20, 1995), the NRC intended these 10 CFR 50.82(a) provisions to remove "the licensee's authority to operate the reactor or to maintain or place fuel in the reactor," and this nonoperating status would thus provide a basis "to remove regulatory requirements that are no longer necessary to protect the public health and safety." It should be noted that, 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 license still incorporates the licensee's CSP as a license condition. As such, a 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) certifications.

4.1.2 Assessment of Option 1

No additional resources would be expended to change the current cyber security requirements set forth in 10 CFR 73.54 if this were not included as part of the power reactor decommissioning rulemaking. The NRC expects that licensees would continue to submit license amendment requests to remove the CSP license condition.

4.2 Option 2A: Remove Requirements When Spent Fuel Is Stored in Dry Casks

4.2.1 Description of Option 2A

The NRC staff received stakeholder input on the 2015 advanced notice of proposed rulemaking suggesting that the NRC amend 10 CFR 73.54 and make conforming changes to other

[17] In addition, 10 CFR 52.79(a)(36)(iii) requires a CSP in accordance with the criteria set forth in 10 CFR 73.54.

regulations that would require the protection of digital computer and communications systems and networks until all spent fuel is moved to dry cask storage.

Under Option 2A, the NRC would pursue a rulemaking to propose that the cyber security requirements in 10 CFR 73.54 would continue to apply to decommissioning power reactors until all the fuel is transferred to dry cask storage. Therefore, cyber security requirements would continue to apply until (1) licensees have transferred all spent fuel to dry cask storage, and (2) the NRC approves a license amendment to remove the CSP license condition. Alternatively, this rulemaking option could include removal of the CSP license condition at the time all fuel is transferred to the dry cask storage. This removal of license conditions would be consistent with the approach being considered by the Commission in the mitigation of beyond-design-basis events rulemaking (SECY-16-0142, "Draft Final Rule—Mitigation of Beyond-Design-Basis Events," dated December 15, 2016 (ADAMS Accession No. ML16301A005)).

It should be noted that, as part of the decommissioning process, licensees will remove balance of plant systems, some safety systems, and potentially some security/emergency preparedness systems from service. These systems are removed through technical specification changes and modifications to their licensing basis. As these systems are removed from service, the licensee has the option of updating their CDA list and removing the CDAs associated with those systems. Since the list of CDAs included in the program's scope is not part of the cyber security license condition, the licensee can make these changes without notifying the NRC, and without any analysis beyond the determination that a given system can be removed from service. The NRC staff estimates that, by the time the licensee has moved all fuel to the spent fuel pool, the scope of remaining CDAs could be reduced by as much as 80 percent through this process. This reduction of CDAs should reduce the regulatory burden for licensees prior to when 10 CFR 73.54 requirements are no longer applicable.

4.2.2 Assessment of Option 2A

In assessing Option 2A, the NRC staff determined that there is a basis for relaxing cyber security requirements before all fuel is placed into dry cask storage. As noted in Section 2.2 of the regulatory basis and in the discussion of Option 2B in Section 4.3 of this appendix, the staff has determined that the risk and potential consequences associated with maintaining spent fuel in the SFP are significantly reduced after an appropriate period of decay. Accordingly, these reduced levels of risk and hazards do not justify the maintenance of cyber security requirements after this decay period until the spent fuel is transferred to dry cask storage. As such, this option will not be analyzed further.

4.3 Option 2B: Remove Requirements When Spent Fuel Is Sufficiently Decayed

4.3.1 Description of Option 2B

Under Option 2B, the NRC would pursue a rulemaking to propose that the cyber security requirements in 10 CFR 73.54 would continue to apply to licensees of decommissioning power reactors that have submitted their 10 CFR 50.82(a)(1) or 10 CFR 52.110(a) certifications until such time that all spent fuel in the SFP has sufficiently decayed (i.e., 10 months for boiling-water reactors and 16 months for pressurized-water reactors). After these periods of time, the fuel in the SFP will have sufficiently decayed such that a period of 10 hours is available to initiate mitigation measures in a postulated zirconium fire scenario, which corresponds to Level 2 as described in Appendix A of this document. Under this option, the NRC staff expects that

decommissioning reactor licensees would request license amendments to remove the CSP license condition once their spent fuel has sufficiently decayed. Alternatively, this rulemaking option could include removal of the CSP license condition at the time all fuel is transferred to dry cask storage. This removal of license conditions would be consistent with the approach being considered by the Commission in the mitigation of beyond-design-basis events draft final rule.

It should be noted that, as part of the decommissioning process, licensees will remove balance of plant systems, some safety systems, and potentially some security/emergency preparedness systems from service. These systems are removed through technical specification changes and modifications to their licensing basis. As these systems are removed from service, the licensee has the option of updating their CDA list and removing the CDAs associated with those systems. Since the list of CDAs included in the program's scope is not part of the cyber security license condition, the licensee can make these changes without notifying the NRC, and without any analysis beyond the determination that a given system can be removed from service. The NRC staff estimates that, by the time the licensee has moved all fuel to the spent fuel pool, the scope of remaining CDAs could be reduced by as much as 80 percent through this process. This reduction of CDAs should reduce the regulatory burden for licensees prior to when 10 CFR 73.54 requirements are no longer applicable.

4.3.2 Assessment of Option 2B

The NRC staff based its assessment of Option 2B on the spent fuel analyses referenced in Section 2.2 of this regulatory basis and as summarized in Section 3.2 of this appendix. The NRC staff has determined that cyber security requirements for decommissioning nuclear power reactors should be consistent with the graded approach to EP as described in Appendix A to this document.

5 REGULATORY SCOPE

The proposed rulemaking for Options 2A and 2B would include revisions to 10 CFR 73.54 to clearly specify the applicability of cyber security requirements to decommissioning power reactors.

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

The proposed rulemaking for Options 2A and 2B is limited to modifying 10 CFR 73.54. There should be no impact to NRC guidance or policy documents.

7 IMPACTS

This section analyzes the "no-action" alternative and the NRC staff's recommended rulemaking option. Option 1 is the "no-action" alternative and would not change the regulatory framework for cyber security. Option 2B is a rulemaking approach that would continue to apply the cyber security requirements in 10 CFR 73.54 to the licensees of decommissioning power reactors until all spent fuel in the SFP has sufficiently decayed such that a period of 10 hours is available to initiate mitigation measures in a postulated zirconium fire scenario.

Under the current process, licensees undergoing decommissioning are still required by license condition to maintain their NRC-approved CSPs until such license conditions are amended or removed pursuant to 10 CFR 50.90. The rulemaking options presented herein are aimed at

establishing regulations to maintain an appropriate level of cyber security during the decommissioning process without the need to perform individual licensing actions.

7.1 Option 1: No Action

Under this option, the NRC staff would continue with the existing decommissioning process as described in the current regulations and guidance. The NRC staff would continue to address cyber security at decommissioning power reactors through amendments to the CSP license conditions.

7.1.1 Impacts on Public Health, Safety, and Security

Because this option would not change the current process, there would be no increase or reduction in public health, safety, and security.

7.1.2 Impacts on Licensees

This option would have no incremental impact on licensees.

7.1.3 Impacts on the NRC

This option would have no incremental impact on the NRC.

7.1.4 Additional Considerations

This option would have no incremental impact on State, local, or Tribal governments.

7.1.5 Summary of Benefits and Costs

There would be no incremental benefits or costs to licensees or the NRC.

7.2 Option 2B: Remove Requirements When Spent Fuel Is Sufficiently Decayed

Under this option, the NRC staff would undertake a rulemaking to remove requirements for decommissioning power reactors when spent fuel is sufficiently decayed. The changes to the underlying regulations would provide clarity as to the degree of cyber security that needs to be maintained during each stage of the decommissioning process. The proposed rule would clarify that cyber security requirements continue to apply to decommissioning power reactors until all fuel is sufficiently decayed in the SFP.

7.2.1 Impacts on Public Health, Safety, and Security

The rulemaking would ensure that safety concerns (e.g., a postulated zirconium fire scenario) are properly addressed in a manner that provides reasonable assurance of the adequate protection of public health and safety and the common defense and security.

7.2.2 Impacts on Licensees

All reactor licensees that have an NRC-approved CSP also have license conditions that reference the plan. This rulemaking would clarify that the CSP license condition can be removed from the license following the submission and docketing of the 10 CFR 50.82(a)(1) certifications once all fuel in the SFP has sufficiently decayed.

Licensees would still need to request a license amendment to remove the CSP license condition. There would be no savings associated with the rulemaking in this regard. Alternatively, the license conditions could be removed through rulemaking. In this case, the staff's approach would be informed by the Commission's decision on the mitigation of beyond-design-basis events final rule, as referenced above.

The rulemaking would clarify and simplify the basis for removing the license condition.

7.2.3 Impacts on the NRC

Overall, this option would result in a one-time cost to the NRC followed by ongoing savings. Initially, the NRC would incur incremental costs to undertake the rulemaking process for this portion of the power reactor decommissioning rulemaking. These costs include the preparation of the proposed rule and accompanying guidance. The costs would include both NRC staff and contractor time to prepare proposed rule language, draft guidance, supporting analyses (e.g., a regulatory analysis and Office of Management and Budget paperwork burden analysis), and a *Federal Register* notice, and for public outreach efforts during the rule and guidance development phases. After publishing the proposed rule, the NRC would incur costs associated with public comment resolution and preparation of the final rule, guidance, and supporting documentation for the rulemaking.

7.2.4 Additional Considerations

The proposed rule would have no incremental impact on State, local, or Tribal governments.

7.2.5 Summary of Benefits and Costs

<u>Benefits</u>

- clear timing of cyber security reductions for power reactor decommissioning
- consistent regulatory approach to cyber security for decommissioning power reactors
- ensures 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

<u>Costs</u>

- one-time cost to the NRC to develop rule and revise guidance

8 BACKFITTING AND ISSUE FINALITY CONSIDERATIONS

The NRC staff has determined that rulemaking to amend cyber security requirements as described in Option 2B would not constitute backfitting as defined in 10 CFR 50.109, "Backfitting," for currently operating or recently shutdown 10 CFR Part 50 reactor licensees and would not violate issue finality for 10 CFR Part 52 combined license holders. The license for each of these licensees contains a CSP license condition that continues to apply after the reactor permanently shuts down, although each of the licensees for the Kewaunee Power Station and Crystal River, Unit 3, was granted a license amendment permitting the licensee to remove the CSP license condition from its license after all of its spent fuel is moved to an ISFSI. For the other recently shutdown or operating 10 CFR Part 50 reactor licensees and 10 CFR Part 52 combined license holders, the rulemaking would replace the license conditions with an amended regulation, thereby maintaining the CSP requirements for these licensees. This rulemaking would not impose a new or changed requirement as these licensees are already implementing the requirement by complying with 10 CFR 73.54 or, if they are in a decommissioning phase, as part of their CSP license conditions.

Option 2B would not constitute backfitting for the licensees for the Kewaunee Power Station and Crystal River, Unit 3. Option 2B would require licensees to maintain their CSP until such time that all spent fuel in the SFP has sufficiently cooled. The spent fuel at Crystal River, Unit 3 has already reached that point. Moreover, the licensee for Crystal River, Unit 3, must maintain its CSP until all spent fuel is moved to an ISFSI. For the Kewaunee Power Station, the licensee certified by letter dated June 22, 2017, that all spent fuel had been removed from the SFP and placed in an ISFSI (ADAMS Accession No. ML17178A375).

A rulemaking under Option 2B may constitute backfitting for other 10 CFR Part 50 licensees that have their CSP license conditions removed by license amendment, or it may violate issue finality for 10 CFR Part 52 combined license holders that do not have a CSP license condition. For these licensees, the NRC would have to assess the language of the license amendment, and whether the rulemaking would involve adequate protection or would be necessary to bring a licensee into compliance with a requirement or commitment and, if not, whether the rulemaking would result in a cost-justified, substantial increase in the protection of public health and safety or the common defense and security.

9 NRC OBSERVATIONS ON STAKEHOLDER FEEDBACK ON THE DRAFT REGULATORY BASIS

9.1 Feedback from Public Meetings

The NRC did not receive any significant feedback during public meetings on the proposed cyber security rulemaking.

9.2 Main Themes from Public Comment Submittals

The public comments on the subject of cyber security regulations fall into the following categories:

- removal of cyber security license conditions
- shutdown reactors
- timing of cyber security reductions

- backfitting
- continuing cyber security requirements at permanently defueled sites

9.2.1 Removal of Cyber Security License Conditions

One public commenter recommended that the NRC add a third option that would amend the Commission's regulations to clarify that cyber security license conditions are removed once a licensee has submitted certifications of permanent removal of fuel from the reactor pursuant to 10 CFR 50.82(a)(1) or 10 CFR 52.110(a).

NRC Response

The NRC staff disagrees with this comment. Once the NRC has docketed a licensee's 10 CFR 50.82 or 10 CFR 52.110 certifications, 10 CFR 73.54 is no longer applicable to that license. However, it is the staff's position that the consequence of a postulated zirconium fire scenario remains sufficiently high to warrant a rulemaking to ensure that cyber security requirements are maintained until all spent fuel in the SFP has sufficiently decayed such that a period of 10 hours is available to initiate mitigation measures. This would preclude the option recommended by the commenter.

9.2.2 Shutdown Reactors

One public commenter stressed that the NRC should ensure that it remains consistent with its previous position that cyber security requirements for operating power reactors should not be applied to shutdown reactors, that the regulatory requirements for shutdown reactors should be consistent with requirements for ISFSIs, and that any regulatory requirements that are developed for shutdown reactors should address a public health and safety or security deficiency.

NRC Response

The NRC staff agrees with this comment in part. The NRC is proposing rulemaking that would continue to apply the cyber security requirements in 10 CFR 73.54 to a licensee of a decommissioning power reactor until all spent fuel in the SFP has sufficiently decayed such that a period of 10 hours is available to initiate mitigation measures in a postulated zirconium fire scenario. This ensures that the safety concerns of a postulated zirconium fire scenario are properly addressed. Once the spent fuel has sufficiently cooled, a licensee may request the removal of cyber security requirements from its license. The NRC staff agrees that once the fuel in the SFP has sufficiently cooled, the cyber security requirements for decommissioning reactors should be consistent with those applicable to ISFSIs.

9.2.3 Timing of Cyber Security Reductions

One public commenter stated that the NRC should use rulemaking to codify the timing of cyber security reductions as a function of spent fuel state and disposition.

NRC Response

The NRC staff agrees with this comment. As such, the NRC is proposing rulemaking that would continue to apply the cyber security requirements in 10 CFR 73.54 to the licensees of

decommissioning power reactors until all spent fuel in the SFP has sufficiently decayed such that a period of 10 hours is available to initiate mitigation measures in a postulated zirconium fire scenario.

9.2.4 Backfitting

Two public commenters expressed concerns over the backfit considerations for the cyber security rulemaking. One of the commenters stated that the proposed rulemaking would constitute a backfit because it extends the applicability of the NRC's cyber security rules beyond the time when a reactor permanently ceases operation and defuels.

NRC Response

The NRC staff disagrees with this comment. The licenses for all currently operating power reactor licensees contain a CSP license condition that continues to apply after the reactor permanently shuts down. The recommended rulemaking would replace these license conditions with an amended regulation that would maintain the CSP requirements for these licensees. Because this rulemaking would not impose a new or changed requirement, as the licensees are already implementing the requirement as part of their CSP license conditions, it would not constitute backfitting as defined in 10 CFR 50.109 for currently operating or recently shutdown 10 CFR Part 50 reactor licensees. As noted above, it may constitute backfitting in certain cases for licensees who have had CSP license conditions removed before the effective date of the rule. The NRC staff views this situation as unlikely based on the technical reviews associated with removing the license conditions, and these licensees will be evaluated individually in developing the basis and applicability for the proposed rule.

9.2.5 Continuing Cyber Security Requirements at Permanently Defueled Sites

One public commenter contended that there is insufficient risk to warrant the continuation of cyber security requirements on facilities that have permanently defueled, because of the configuration of SFPs, the availability of reliable SFP level indication, and the defense-in-depth capabilities to maintain or reestablish fuel pool inventory to mitigate the risk that a cyber attack could result in a radiological release to an acceptably low level.

NRC Response

The NRC staff disagrees with this comment. It is the staff's position that the consequence of a postulated zirconium fire scenario remains sufficiently high to warrant a rulemaking to ensure that cyber security requirements are maintained until all spent fuel in the SFP has sufficiently cooled such that a period of 10 hours is available to initiate mitigation measures.

10 NRC RECOMMENDATION

The NRC recommends Option 2B. Under this option, the NRC staff 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 the existing regulations 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 the adequate protection of public health and safety and the common defense and security.

APPENDIX D
DRUG AND ALCOHOL TESTING

CONTENTS

1 INTRODUCTION

The purpose of nuclear power reactor fitness-for-duty (FFD) programs is to help ensure that individuals are not under the influence of any substance or mentally or physically impaired from any cause that could adversely affect their abilities to safely and competently perform their duties. These programs also help provide assurance that these individuals are trustworthy and reliable. There is an inconsistency in the scope of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 26, "Fitness for Duty Programs." Currently, the FFD requirements in 10 CFR Part 26 apply differently to Parts 50 and 52 licensees undergoing decommissioning.

In a related matter, consistent with the requirements in 10 CFR Part 73, "Physical Protection of Plants and Materials," power reactor licensees must implement an Insider Mitigation Program (IMP). The IMP is designed to help ensure the trustworthiness and reliability of individuals given unescorted access to nuclear power plants. As required by 10 CFR 73.55(b)(9)(ii)(B), the IMP must include elements of the FFD programs required by 10 CFR Part 26. However, the regulations do not identify which FFD program elements must be included in the IMP.

In this appendix, the staff seeks to address the inconsistency in the scope of 10 CFR Part 26 as it applies to Part 50 and Part 52 licensees. This appendix also discusses the purpose of an IMP and seeks to clarify the FFD program elements that must be incorporated into the IMP. This appendix presents the NRC staff's analysis of two options to address these issues.

2 EXISTING REGULATORY FRAMEWORK

FFD program requirements, including drug and alcohol testing requirements, are provided in 10 CFR Part 26. The discussion in this appendix is limited to those FFD requirements related to drug and alcohol testing, behavioral observation, and employee assistance programs. Fatigue management aspects of the 10 CFR Part 26 FFD program and their applicability to decommissioning reactor licensees are discussed in Appendix K to this document.

2.1 Fitness for Duty Program

The requirement in 10 CFR 26.3(a) lists those licensees that are required to comply with designated subparts of 10 CFR Part 26, including "[l]icensees who are authorized to operate a nuclear power reactor under 10 CFR 50.57, and holders of a combined license 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 combined licenses issued under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," throughout decommissioning. Therefore, there is an inconsistency in the application of FFD requirements to Part 50 and Part 52 licensees during decommissioning.

2.2 Insider Mitigation Program

As described in 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage," nuclear power reactors licensed under 10 CFR Parts 50 and 52 are required to establish and maintain a physical protection program

that will have as its objective to provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety. The physical protection program must protect against the design basis threat (DBT) of radiological sabotage as stated in 10 CFR 73.1, "Purpose and scope," which includes both external and internal threats.

Under 10 CFR 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). The IMP helps implement defense-in-depth methodologies to minimize the potential for an insider to adversely affect, either directly or indirectly, the licensee's capability to prevent significant core damage or spent fuel sabotage. The IMP requirements in 10 CFR 73.55(b)(9) apply to all nuclear power reactor licensees, even those undergoing decommissioning.

As required by 10 CFR 73.55(b)(9)(ii)(B), licensees must implement an IMP that contains "elements from … [t]he fitness-for-duty program described in [10 CFR Part 26]." The FFD program objectives under 10 CFR Part 26, Subpart B, directly support the objectives of an IMP. The FFD performance objective in 10 CFR 26.23(a) requires the FFD program to "[p]rovide reasonable assurance that individuals are trustworthy and reliable as demonstrated by the avoidance of substance abuse." "Substance abuse" is defined in 10 CFR 26.5 to mean "the use, sale, or possession of illegal drugs, or the abuse of prescription and over-the-counter drugs, or the abuse of alcohol." The Commission explained in the statement of considerations for the 2008 Part 26 final rule the ways that substance abuse "presents an unacceptable risk to public health and safety and the common defense and security":

> First, by increasing an individual's vulnerability to coercion, substance abuse increases the likelihood that such individuals may pose an insider threat. Under 10 CFR 73.1 [Purpose and scope], a passive insider is defined as an individual who obtains or attempts to obtain safeguards or other relevant information, such as a nuclear power plant's physical configuration and design, and who does not have a functional or operational need to know this information. Section 73.1 defines an active insider as a knowledgeable individual who, while within the protected area of a nuclear power plant in an unescorted status, takes direct action to facilitate entrance and exit, disable alarms and communications, and/or participates in a violent attack. An individual who uses illegal drugs may be coerced into cooperating, actively or passively, with a terrorist in an attempt to commit radiological sabotage if, for example, the terrorist were to threaten the individual with revealing his or her illegal drug use or was somehow able to withhold drugs from an individual who is addicted.
>
> Second, an individual's judgment and self-control are impaired while an individual is abusing drugs or alcohol. When an individual is intoxicated from abusing any of the substances for which testing is conducted under Part 26, including alcohol, the individual is more likely to inadvertently reveal sensitive information that terrorists could use in a radiological sabotage attempt than when he or she is not intoxicated.
>
> Third, the use of illegal drugs establishes that an individual is willing to disobey the law, thus indicating that the individual will disregard other rules and regulations. The use of illegal drugs raises questions about the individual's

trustworthiness and reliability in terms of scrupulously following the regulations, procedures, and other requirements, such as safeguards requirements, that ensure the protection of public health and safety.

73 *Federal Register* 16965, 17009; March 31, 2008.

However, 10 CFR 73.55(b)(9) does not specify which FFD program elements must be part of the IMP for either operating or decommissioning reactors. Therefore, licensees must make their own determination as to which 10 CFR Part 26 elements to incorporate to support their IMP. When their reactors are operating, licensees necessarily comply with the IMP requirement to implement elements of their FFD programs because licensees are implementing all the FFD elements required by 10 CFR Part 26. Part 50 power reactor licensees in decommissioning must still comply with the IMP requirements even though 10 CFR Part 26 does not apply to them. The NRC understands that these licensees have been maintaining their full drug and alcohol testing programs during decommissioning, which would enable them to comply with the IMP requirements in 10 CFR 73.55(b)(9)(ii)(B). Since 10 CFR Part 26 does not apply to a 10 CFR Part 50 licensee in decommissioning, the licensee could choose to discontinue its 10 CFR Part 26 drug and alcohol testing program. However, to maintain compliance with the 10 CFR 73.55(b)(9)(ii)(B) IMP requirement, the licensee could choose to implement any 10 CFR Part 26 FFD program elements that they deem appropriate to support their IMP program.

3 TECHNICAL BASIS FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

There is currently an inconsistency in the applicability of 10 CFR Part 26 to 10 CFR Part 50 and Part 52 licensees during decommissioning. As a result of this inconsistency, 10 CFR Part 26 does not apply to 10 CFR Part 50 licensees once the NRC has docketed their 10 CFR 50.82(a)(1) certifications. However, 10 CFR Part 52 licensees are required to maintain a full FFD program during decommissioning. The NRC staff has determined that there is no technical basis for this inconsistency. Therefore, the NRC staff intends to clarify this inconsistency by making it clear 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.

As discussed above, licensees must implement an IMP that incorporates elements of a 10 CFR Part 26 FFD program. However, the regulation does not specify what those elements are. The purpose of a licensee's IMP is to help ensure that individuals granted UAA or UA remain trustworthy and reliable and do not pose a threat to the facility. The NRC staff intends to clarify the 10 CFR Part 73 IMP rule language by establishing an appropriate set of FFD provisions to be incorporated into the IMP to help confirm that individuals granted UAA or UA to the PA are trustworthy and reliable (as demonstrated, in part, by the avoidance of substance abuse).

The NRC staff 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. The same appendix (section I.B.2.a) requires that security personnel "demonstrate mental alertness and the capability to exercise good judgement." Although not specifically used as the basis for this recommended rulemaking, continuation of drug and alcohol testing will support the licensee's continued adherence to these provisions of 10 CFR Part 73, Appendix B.

3.1 Insider Mitigation Program Considerations

Insider threats present a unique problem for a physical protection system. Insiders possessing UAA or UA could take advantage of their position, authority, and/or knowledge of a facility, to understand, bypass, or defeat dedicated physical protection elements or other provisions (such as measures for safety or material control and accounting, including operating measures and procedures) to commit radiological sabotage.

The staff seeks to clarify those FFD elements that would support the objective of a licensee's IMP to ensure that those personnel who maintain UAA or have UA to the PA or VA remain trustworthy and reliable. Given the applicability of the IMP requirement throughout the life of the license, identification of appropriate 10 CFR Part 26 elements for incorporation into a licensee's IMP will be applicable to both operating and decommissioning facilities.

The staff 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 hazard and potential event consequences associated with decommissioning facilities have significantly decreased in comparison to those associated with the operating facilities. The spent fuel pool becomes the primary focus of the licensee's security mission to protect against the DBT adversary as most (if not all) of the other target sets are no longer relevant when a nuclear power reactor is no longer operational.

While in decommissioning, the potential contribution of certain personnel to support an adversary as an insider is also greatly reduced. Individuals who have security-related responsibilities or who do 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. In contrast, individuals who do not have any security-related responsibilities or regular spent fuel pool area access will have less potential contribution as an insider.

Staff notes that maintenance of a full 10 CFR Part 26 FFD program will clearly support a licensee's IMP during operations or decommissioning. However, staff intends to explore modification of the IMP regulation to permit a graded approach to application of the 10 CFR Part 26 elements to various populations at a decommissioning site.

NRC staff is also currently revising RG 5.77, "Insider Mitigation Program," to define more clearly those elements of 10 CFR Part 26 that support maintenance of a trustworthy and reliable workforce under the requirements of the IMP. This effort would continue regardless of whether rulemaking is pursued. Should this rulemaking result in changes that would affect the content of the guidance, conforming changes would be made to the guidance.

4 RULEMAKING OPTIONS

4.1 Option 1: No Action

4.1.1 Description of Option 1

The no-action option 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.

The no-action option 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 staff 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.

4.1.2 Assessment Of Option 1

As discussed above, the FFD scope as defined in 10 CFR 26.3 for decommissioning sites is not consistent for facilities licensed under 10 CFR Part 50 and 10 CFR Part 52. Continuing this inconsistency will result in differing applicability requirements for what the staff has determined are essentially similarly situated nuclear power reactor facilities during decommissioning.

Under Option 1, 10 CFR Part 73.55(b)(9)(ii)(B) would continue to be ambiguous as to which elements of the drug and alcohol testing program licensees should incorporate into their IMP. Therefore, licensees may make individual decisions on which FFD elements to use to support their IMP. This could result in variations in how licensees are implementing their IMP. Although the NRC staff is currently revising RG 5.77 to identify FFD program elements that licensees may wish to use to support their IMP, reactor licensees would not be required to adopt the new guidance. Variations in how licensees incorporate FFD elements into their IMP could complicate NRC inspection and enforcement of the licensee's IMP and physical security programs. The staff notes that operating reactors already implement a full FFD program per the requirements of Part 26, and, as a matter of practice, decommissioning power reactor licensees have continued their entire FFD programs including drug and alcohol testing, behavioral observation, and employee assistance, with attendant expenses.

4.2 Option 2: Rulemaking to Require Fitness for Duty Program Elements that Support IMP for Power Reactors

4.2.1 Description of Option 2

Option 2 would entail a 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 Option 2 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.

4.2.2 Assessment Of Option 2

Under Option 2, 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). These changes are necessary to ensure that FFD program elements necessary to maintain assurance that individuals at reactor sites, particularly decommissioning sites, remain trustworthy and reliable are implemented consistently throughout the industry.

5 REGULATORY SCOPE

The scope of the recommended rulemaking will include correcting the inconsistencies in 10 CFR 26.3(a), between 10 CFR Part 50 and 10 CFR Part 52 licenses during decommissioning. Further, the NRC staff's clarifications will help ensure consistent implementation of FFD program elements for both operating and decommissioning facilities to support 10 CFR 73.55(b)(9).

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

6.1 NRC Guidance

The NRC has not issued regulatory guidance for the drug and alcohol testing regulations found in 10 CFR Part 26, as these requirements are considered sufficiently explicit. The NRC staff will continue efforts to update RG 5.77 independent of any rulemaking. Should the rulemaking change the IMP requirements in a way that is in conflict with RG 5.77, conforming changes would be made to the guidance.

6.2 Policy Issues

There are no specific policy issues associated with either of the NRC staff's options.

6.3 Implementation Issues

There are no specific implementation issues associated with either of the NRC staff's options.

7 IMPACTS

This section provides an analysis of the two options: no action and rulemaking.

7.1 Option 1: No Action

Under this option, the NRC staff would continue with the existing decommissioning process as described in the current regulations and guidance. Under the current process, the requirements of 10 CFR Part 26 do not apply to Part 50 licensees undergoing decommissioning after the NRC has docketed their 10 CFR 50.82(a)(1) certifications. However, 10 CFR Part 52 licensees would still be required to implement 10 CFR Part 26 requirements until the end of their licenses.

In order to meet the IMP requirements under 10 CFR 73.55(b)(9), licensees' IMPs must contain elements of an FFD program described in 10 CFR Part 26. The NRC staff determined that because the specific elements of 10 CFR Part 26 are not clearly defined for an IMP, licensees may develop site-specific interpretations of which elements should be implemented. This

clarification is particularly important for Part 50 licensees undergoing decommissioning (as they are not required to implement a full FFD program during decommissioning).

Under this option, separate from rulemaking, the NRC staff is pursuing a revision to existing IMP guidance (RG 5.77) to address the NRC staff's position on the elements of FFD programs for an IMP. If the updated RG 5.77 is approved and licensees voluntarily incorporate RG 5.77, revision 1 into their physical security plan (PSP), then the provisions of that security plan, including the RG provisions incorporated into the plan, would become enforceable against the licensee since the security plan is a condition of the license. However, there is no requirement for licensees to incorporate RGs into their PSP.

7.1.1 Impacts on Public Health, Safety, and Security

As a matter of practice, all decommissioning power reactor licensees to date have continued their FFD programs including drug and alcohol testing, behavioral observation and employee assistance. As such, there would be no increase or reduction in public health, safety, and security for these licensees.

7.1.2 Impacts on Licensees

Option 1 would not result in any changes for licensees.

7.1.3 Impacts on the NRC

The lack of a clear regulatory framework could potentially result in site-specific interpretations of applicable IMP FFD elements if licensees do not maintain their existing FFD programs throughout decommissioning or if licensees do not adopt the upcoming revision to RG 5.77. Such site-specific interpretations of applicable FFD elements could result in inconsistencies in how licensees implement the IMP FFD elements. These inconsistencies could result in an increase in cost to the inspection and enforcement process.

7.1.4 Additional Considerations

This option would have no incremental impact on State, local, or Tribal governments.

7.1.5 Summary of Benefits and Costs

<u>Benefits</u>

There would be no changes to how licensees currently implement their FFD programs or IMP.

<u>Costs</u>

Combined license holders under 10 CFR Part 52 would need to implement 10 CFR Part 26 FFD program requirements that 10 CFR Part 50 licensees are not required to maintain.

If implementation of 10 CFR Part 26 elements supporting IMP varies appreciably at different sites, inconsistencies could result in an increase in cost to the inspection and enforcement process for both NRC and licensees.

7.2 Option 2: Rulemaking to Require Fitness for Duty Program Elements for Power Reactors

Under this option, the NRC staff would undertake a rulemaking to correct the scope under 10 CFR 26.3(a) so that 10 CFR Part 50 and 10 CFR Part 52 licensees are subject to the same FFD requirements. The rulemaking would also clarify the FFD program elements that would have to be incorporated into a licensee's IMP for nuclear power reactors. This approach will ensure that the appropriate elements of FFD are maintained throughout the term of the license to support the IMP.

7.2.1 Impacts on Public Health, Safety, and Security

This option would ensure consistency in the implementation of FFD elements supporting IMP during decommissioning. Measures that help ensure maintenance of a trustworthy and reliable workforce help mitigate the insider threat as identified by the radiological sabotage DBT.

7.2.2 Impacts on Licensees

If the scope of 10 CFR Part 26 were to be modified to be consistent for reactors during decommissioning regardless of whether they were licensed under 10 CFR Part 50 or Part 52, the Part 52 decommissioning reactors would not be required to implement FFD requirements that Part 50 facilities are not currently required to implement.

Current holders of 10 CFR Part 50 licenses are currently implementing all of the 10 CFR Part 26 requirements, except Subparts I and K, during decommissioning. While this practice certainly supports IMP implementation (and continues to ensure that individuals are fit for duty), some provisions may not be strictly necessary to support IMP.

If the rulemaking effort were to be successful in reworking the structure of the IMP requirements to allow for a graded application of 10 CFR Part 26 elements to various populations at licensee sites, the cost to implement 10 CFR Part 26 provisions should reduce over time, commensurate with the reduced potential for insiders to affect radiological sabotage at a decommissioning site and the reduced hazard presented by the spent fuel.

7.2.3 Impacts on the NRC

Overall, this option would result in a one-time cost to the NRC followed by ongoing savings. Initially, the NRC would incur incremental costs to undertake the rulemaking process for this portion of the power reactor decommissioning rulemaking. These costs include the preparation of the proposed rule and, if needed, accompanying guidance. The costs would include both NRC staff and contractor time to prepare proposed rule language, draft guidance, supporting analyses (e.g., a regulatory analysis and Office of Management and Budget paperwork burden analysis), and a *Federal Register* notice, and for public outreach efforts during the rule and guidance development phase. After publishing the proposed rule, the NRC would incur costs associated with public comment resolution and preparation of the final rule, guidance, and supporting documentation for the rulemaking.

7.2.4 Additional Considerations

The recommended rule would have no incremental impact on State, local, or Tribal governments.

7.2.5 Summary of Benefits and Costs

Benefits

- Correction of inconsistency in 10 CFR 26.3(a) for 10 CFR Part 50 and 10 CFR Part 52 licenses during decommissioning.
- Enhanced regulatory clarity and predictability during the decommissioning process.
- Identification of FFD elements necessary to satisfy IMP requirements; in addition, reduction in costs to licensees, as the population of individuals subject to all the elements of 10 CFR Part 26 decreases.

Costs

- The one-time cost to NRC for development and implementation of the revised rule.

8 BACKFITTING AND ISSUE FINALITY CONSIDERATIONS

Neither option presented by the NRC staff in this appendix would constitute backfitting under 10 CFR 50.109, "Backfitting," or violate any issue finality provision in 10 CFR Part 52 if the NRC implemented the option. Option 1 would allow licensees to continue implementing the elements of Part 26 that the licensee chooses to implement to comply with 10 CFR 73.55(b)(9)(ii)(B). Option 2 would explicitly set forth the FFD elements licensees must impement to satisfy the IMP requirements. Because licensees are already required to comply with the IMP requirements, this rulemaking option would clarify existing requirements.

The recommended changes to 10 CFR 26.3 would be an administrative change to ensure 10 CFR Part 50 and Part 52 licensees implement the same FFD requirements.

9 NRC OBSERVATIONS ON STAKEHOLDER FEEDBACK ON THE DRAFT REGULATORY BASIS

9.1 Feedback from Public Meetings

During the public meeting held during the draft regulatory basis comment period, the staff did not receive any appreciable technical comments from either the public or industry.

9.2 Main Themes from Public Comment Submittals

On June 13, 2017, staff received four public comment submissions on Appendix D, "Drug and Alcohol Testing," to the draft regulatory basis for the "Regulatory Improvements for Power Reactors Transitioning to Decommissioning" rulemaking. The following observations reflect the NRC staff's review and consideration of the comments received on the draft regulatory basis.

Overall, the NRC staff received comments supporting both Option 1 (no change to include RG 5.77) and Option 2 (rulemaking).

Two commenters expressed a preference to allow licensees to continue with the existing regulatory framework during decommissioning including the 10 CFR Part 26 elements necessary for satisfying the IMP as specified in 10 CFR 73.55(b)(9). However, NRC staff is concerned that

because the specific elements of 10 CFR Part 26 are not clearly defined for an IMP, decommissioning licensees may develop site-specific interpretations of which elements should be implemented and, as a result, there may be variations in how licensees implement the 10 CFR Part 26 elements of their IMP.

Another commenter expressed the need for decommissioning licensees to be required to maintain their current 10 CFR Part 26 FFD program throughout decommissioning. The NRC staff does not agree that a full Part 26 program is necessary during decommissioning. Therefore, staff intends to engage in a rulemaking to clarify the scope of 10 CFR 26.3 for nuclear power reactor licensees in decommissioning. In a related matter, staff is considering adopting a graded set of FFD program elements to support a licensee's IMP that would be applicable both during reactor operation and during decommissioning.

One other commenter agreed that rulemaking is necessary for decommissioning sites. Staff agrees that rulemaking is necessary for clearly defining the FFD elements necessary for IMP.

The staff decision to proceed with rulemaking was made so that the Part 26 elements necessary for meeting 10 CFR 73.55(b)(9)(ii)(B) are clearly defined, and to ensure consistency within NRC regulations and among licensee implementation of FFD requirements. Additionally, this rulemaking supports the NRC goals of clarity and openness in regulatory actions for both licensees and the public.

10 NRC STAFF RECOMMENDATION

The NRC staff recommends rulemaking as described in Option 2.

APPENDIX E

MINIMUM STAFFING AND TRAINING REQUIREMENTS FOR NON-LICENSED OPERATORS, INCLUDING CERTIFIED FUEL HANDLERS

CONTENTS

1 INTRODUCTION

The U.S. Nuclear Regulatory Commission's (NRC's) nuclear power plant regulations do not address minimum licensed operator staffing levels or 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 certified fuel handler (CFH) and an additional non-licensed operator (NLO) as the minimum staffing necessary for each shift. Furthermore, decommissioning plants are discontinuing the associated licensed operator training programs.

During decommissioning, the principal safety concern is the safe storage of spent fuel in the spent fuel pool (SFP). The skills needed for maintaining safe storage of spent fuel are not comparable to the skills needed for operating a nuclear power plant. Overall safety at decommissioning reactors depends primarily on the procedural and configuration controls exercised by the licensee over often varied and unique dismantlement and decontamination activities. The NRC staff's technical study on SFP risk at decommissioning nuclear power plants (NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," issued February 2001 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML010430066)) did not recommend any minimum staffing levels or training requirements inherent in supporting the risk conclusions. However, the study did show that the human error probabilities affect the frequency of events that could lead to a spent fuel uncovery and potential zirconium fire. The NRC staff considered three options: (1) take no action, (2) credit voluntary industry initiatives to provide staff and training for permanently shutdown and defueled reactors and to clarify related definitions, and (3) change the regulations for the definition of CFHs and provide guidance regarding minimum staffing by CFHs and NLOs for decommissioning reactors.

2 EXISTING REGULATORY FRAMEWORK

2.1 Staffing

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. Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(m) governs the number of senior reactor operators required to be present at the facility based on the number of units operating, the number of units on site, and the number of control rooms. The regulation includes several statements that indicate that it applies only to operating reactors. Footnote 2 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 10 CFR 50.54(m) describes a unit as operating "when it is in a mode other than cold shutdown or refueling." Thus, "non-operating" would be when a unit is in cold shutdown or refueling mode. Further, 10 CFR 50.54(m)(1) discusses startup, shutdown, and refueling activities; 10 CFR 50.54(m)(2)(ii) references "fueled units"; 10 CFR 50.54(m)(2)(iii) covers operational modes other than cold shutdown or refueling; and 10 CFR 50.54(m)(2)(iv) concerns core alterations. None of the above activities can be performed at a permanently shutdown and defueled unit. Therefore, 10 CFR 50.54(m) does not apply to permanently shutdown and defueled reactor licensees, such as those that have submitted the certifications required under 10 CFR 50.82(a)(1) or 10 CFR 52.110(a). The NRC's docketing of these

certifications removes the licensee's authority to operate the reactor or emplace or retain fuel in the reactor vessel. Consequently, no regulations provide staffing requirements for decommissioning reactor licensees.

The regulations in 10 CFR Part 55, "Operators' Licenses," establish procedures and criteria for the licensing of operators and senior operators of power reactors. An "operator" is defined in 10 CFR 55.4, "Definitions," as an individual licensed under 10 CFR Part 55 to manipulate a control of a facility. A "senior operator" is defined in 10 CFR 55.4 as an individual licensed under 10 CFR Part 55 to manipulate the controls of a facility and to direct the licensed activities of licensed operators. In 10 CFR 55.4, the NRC defines "controls" used in regard to a nuclear reactor as "apparatus and mechanisms the manipulation of which directly affects the reactivity or power level of the reactor." Because a decommissioning reactor licensee is not authorized to operate the reactor, the plant is not "operating." Because that reactor is permanently defueled, no manipulation of controls that affect reactor reactivity or power can occur at the decommissioning reactor. Therefore, the requirements in 10 CFR Part 55 do not apply to a decommissioning reactor licensee.

2.2 Certified Fuel Handlers

In its proposed rule titled, "Decommissioning of Nuclear Power Reactors," published in Volume 60 of the *Federal Register* (FR), page 37374, on July 20, 1995 (60 FR 37374), the Commission explained the role of the CFH during emergency actions (60 FR 37379) as follows:

> I. Emergency Actions
>
> In 10 CFR 50.54(x) a licensee is allowed to take reasonable actions that may depart from a license condition or technical specification in an emergency. This is permitted when action is immediately needed to protect the public health and safety and no actions consistent with license conditions and technical specifications that can provide adequate or equivalent protection are immediately apparent.
>
> These regulations serve to ensure that emergency action decisions necessary to protect the public health and safety are made by an individual who has both the requisite knowledge and plant experience. The licensed senior operator at an operating nuclear power reactor has the requisite knowledge and experience to evaluate plant conditions and make these judgments.
>
> The Commission is proposing to amend 10 CFR 50.54(y) to permit a certified fuel handler at nuclear power reactors that have permanently ceased operations and permanently removed fuel from the reactor vessel, subject to the requirements of [10 CFR] 50.82(a) and consistent with the proposed definition of "Certified Fuel Handler" specified in [10 CFR] 50.2, to make these evaluations and judgments. A nuclear power reactor that has permanently ceased operations and no longer has fuel in the reactor vessel does not require a licensed individual to monitor core conditions. A certified fuel handler 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 these judgements.

In its final rule titled, "Decommissioning of Nuclear Power Reactors" (61 FR 39278; July 29, 1996), the Commission adopted the above changes. Therefore, since 1996, the Commission's regulations in 10 CFR 50.2, "Definitions," define a CFH for a nuclear power reactor facility as "a non-licensed operator who has qualified in accordance with a fuel handler training program approved by the Commission."

The Commission's regulations do not set standards of approval for a fuel handler training program beyond the text of 10 CFR 50.120, "Training and qualification of nuclear power plant personnel." Under 10 CFR 50.120, the NRC requires applicable entities to establish, implement, and maintain a training program that is derived from a systems approach to training (SAT) and that provides for the training and qualification of, among other personnel, NLOs. The requirements of 10 CFR 50.120 apply to each applicant for and holder of an operating license under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," and each holder of a combined license issued under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

The regulations in 10 CFR 50.120 do not address the process by which an NLO becomes qualified as a CFH through the Commission-approved fuel handler training program. However, the Commission stated the following in its final rule titled, "Training and Qualification of Nuclear Power Plant Personnel," published on April 26, 1993 (58 FR 21904):

> As stated in the preamble for the proposed rule, qualification in the context of this rule means job task qualification. The proposed rule contained the requirement that licensees and applicants develop, implement, and maintain a SAT-based training program to ensure that nuclear power personnel are qualified to perform the tasks of their jobs. Because licensees and applicants must comply with all applicable regulations, there should be no ambiguity concerning the fact that successful completion of a training program does not obviate the need to comply with any other training or qualification requirements imposed by other regulations or license conditions. This means that nuclear power plant personnel must also meet the licensees' initial job qualification requirements imposed as part of initial employment.

At the time of the 1993 Training and Qualification of Nuclear Power Plant Personnel final rule, the NRC staff did not specifically consider the applicability of its requirements to CFHs because the NRC did not add the definition of a CFH to 10 CFR 50.2 until the issuance of the decommissioning rule in 1996. However, in the 1993 final rule, the NRC stated the following on training and continuing to use an SAT during decommissioning (58 FR 21907):

> The SAT-process ensures that as plant conditions change, training programs will be revised to reflect these changes. These revisions could include the development of new programs or the elimination of obsolete programs. However, the process also ensures that the modification of the program to reflect the changed environment is performed in an orderly fashion. If permanent changes in the condition of the plant (i.e., decommissioning or POL [having a possession-only license]) make some or all existing training programs unnecessary, the licensee would obtain relief from these requirements by applying for an exemption eliminating or modifying the affected programs.

The applicable regulation at 10 CFR 50.120(b)(3) states the following:

> The training program must incorporate the instructional requirements necessary to provide qualified personnel to operate and maintain the facility in a safe manner in all modes of operation. The training program must be developed to be in compliance with the facility license, including all technical specifications and applicable regulations. The training program must be periodically evaluated and revised as appropriate to reflect industry experience as well as changes to the facility, procedures, regulations, and quality assurance requirements. The training program must be periodically reviewed by licensee management for effectiveness. Sufficient records must be maintained by the licensee to maintain program integrity and kept available for NRC inspection to verify the adequacy of the program.

Therefore, the NRC staff has found that the use of the SAT and the requirements of 10 CFR 50.120(b)(3) are appropriate and applicable for training of NLOs, including those NLOs who are also qualified as CFHs, for nuclear power reactors during the decommissioning process.

Attachment 1, "Integrated Rulemaking Plan for Emergency Planning, Insurance, Safeguards, Staffing and Training, and Backfit at Decommissioning Nuclear Power Plants," to SECY-00-0145, "Integrated Rulemaking for Nuclear Power Plant Decommissioning," dated June 28, 2000 (ADAMS Accession No. ML003721626), discusses the regulatory framework concerning operator and fuel handler staffing during decommissioning and states, in part, the following:

> The certified fuel handler is intended to be the onshift licensee representative who is not only responsible for safe fuel handling operations at a decommissioning plant, but is always present on shift to ensure the safe maintenance and storage of spent fuel and the overall safety of any decommissioning-related activities at the facility.
>
> In addition, the certified fuel handler must be qualified in accordance with a certified fuel handler training program approved by the Commission. However, there are no regulations besides the definition that specifies the training requirements for the certified fuel handler.

Considering the current definition of CFH in 10 CFR 50.2, the background provided by the 1996 decommissioning final rule that added that definition, and the insights provided in SECY-00-0145, the NRC staff determined that, in addition to the requirements contained in 10 CFR 50.120, 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.

The NRC staff used these three broad-scope objectives in determining the acceptability of licensee fuel handler training programs suitable to qualify a CFH (e.g., Dominion Energy Kewaunee, Inc., ADAMS Accession No. ML14104A046; Florida Power Corporation, Inc., ADAMS Accession No. ML14155A181; Southern California Edison, ADAMS Accession No. ML13268A165).

3 TECHNICAL BASIS FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

3.1 Staffing

Under 10 CFR 50.54(m) and 10 CFR Part 55, the NRC does not require licensed operators at decommissioning reactors. The NRC regulations do not explicitly state the staffing requirements for licensed operators after a reactor has permanently shut down and defueled under 10 CFR 50.82(a)(1) or 10 CFR 52.110(a). When licensees permanently shut down their reactors, they must continue to meet the minimum staffing requirements in the technical specifications and required programs (e.g., emergency response organizations, fire brigade, and security). Given the reduced risk of a radiological incident once the certifications of permanent cessation of operation and permanent removal of fuel from the reactor vessel have been submitted, licensees typically transition their operating staff to a decommissioning organization. This transition includes replacing licensed senior operators with CFHs as the onshift management representatives responsible for supervising and directing the monitoring, storage, handling, and cooling of irradiated nuclear fuel in a manner consistent with ensuring public health and safety. Licensees submit license amendment requests to the NRC to change their technical specifications to reflect the staffing changes during decommissioning.

Regarding the minimum staffing requirements for decommissioning nuclear power reactors, the NRC staff considered analogous matters from the history of rulemaking for licensed operator staffing at nuclear power plants in 10 CFR 50.54(m). In the final rule titled, "Licensed Operator Staffing at Nuclear Power Units," published on July 11, 1983 (48 FR 31611), the NRC explained the need for 10 CFR 50.54(m), as follows:

> Several commenters stated that the NRC had not provided adequate justification of the need for codifying the proposed staffing requirements and that the comment period should be extended until the staff develops a technical basis which demonstrates an increase in safety as a result of implementation of the rule. While an empirical data base which specifies the exact number and qualifications of licensed operators needed on shift at nuclear power plants does not exist, the basis described below is considered sufficient to warrant these increased staffing requirements pending confirmation by research programs which are planned or are currently underway.
>
> The Commission notes, in this regard, that although these staffing levels have been Commission policy for several years, they have not previously been codified through rulemaking because of a belief that the industry recognized the importance of adequate, competent staffing and would voluntarily implement these staffing levels. However, that assumption has been proven false in several cases. The Commission has therefore decided that to protect the health and safety of the public, it is necessary to adopt this rule to guarantee that all plants

have an adequate number of licensed operators and senior operators available on shift.

Further, in the notice for the final rule, the NRC stated the following (48 FR 31612):

> A shift supervisor with a senior operator's license shall be on site at all times that any unit is loaded with fuel. The presence of this individual will assure that a technically competent supervisor will be present on each shift to direct the overall operation of the plant. A situation can arise at any time that requires the presence of someone with knowledge of the facility's technical specifications and the conditions and limitations in the facility license. Under current NRC requirements, senior operators are examined in more depth and more areas concerning a unit's conditions, limitations, and specifications than a reactor operator or unlicensed manager. In addition, a senior operator normally has more operational experience, further enhancing the senior operator's ability to respond to any situation that may occur. The absence of this knowledge on site, where it is readily available, could possibly create a hazardous condition.
>
> …
>
> A senior operator's technical expertise is required in the control room in addition to a reactor operator's technical expertise because of the differences in their training programs and experience. A senior operator typically has greater operating experience than a reactor operator. Also, a senior operator is trained and examined in seven areas that are not required for a reactor operator. … More detailed knowledge in some of these areas would be helpful to the operators in the control room in the event of an emergency. … Individuals with this knowledge have a better basis to provide a broader viewpoint and, therefore, should be available in the control room of an operating nuclear power plant at all times.
>
> The requirement for a senior operator's continuous presence in the control room would assure that: (1) A person is available who can provide the oversight function of the supervisor so that the probability of detecting abnormal events early enough to mitigate potential adverse consequences might be increased; (2) the senior operator in the control room is aware of plant conditions prior to and resulting from an abnormal event so that the senior operator will be able to use extra experience, training and knowledge to act promptly to mitigate that event; and (3) the reactor operator is able to direct attention to performing immediate actions necessary to mitigate that event rather than having to brief the senior operator about the background of that event if that person were absent from the control room. It cannot be foreseen how quickly accidents will develop; having a senior operator in the control room at the initiation of any incident, rather than several minutes later if the senior operator is simply on site, could alleviate potentially serious consequences of foreseeable events. The presence of a senior operator, with increased experience and training, will also increase the probability of correctly detecting abnormal events and human error early enough to mitigate potential consequences of any accident. The Commission finds that these considerations are sufficient to justify imposition of the requirement that a senior operator be present at all times in the control room from which the unit is being operated.

In evaluating the NRC's justification for the 1983 rulemaking to determine the appropriate regulatory framework for decommissioning facility staffing, the NRC staff notes the following:

- Most of the recent experience with permanently shutdown and defueled reactors is limited to single-unit sites. Therefore, in the absence of NRC guidance and industry licensing experience, it is not certain whether licensees with two or more units that would enter the decommissioning process in the future would propose staffing levels by NLOs and CFHs that would be acceptable to the NRC staff.

- Although there is a significant reduction in radiological risk and consequences of an accident for a nuclear power reactor undergoing decommissioning as compared to an operating reactor, some of the considerations similar to those used in the 1983 rulemaking for the licensed operator staffing at operating nuclear power plants would still apply for decommissioning facilities. In particular, the continuous presence of a technically competent shift supervisor on each shift is important to oversee the safe operation of the decommissioning facility and direct onsite activities necessary for safe storage and maintenance of the nuclear fuel. Previously issued amendments to the technical specifications of licensees that have decommissioned their facilities included provisions that required that a CFH fill the shift supervisor position (ADAMS Accession Nos. ML14097A145, ML14183B240, ML14217A072, and ML16235A413).

- In addition to the technical expertise of an NLO, the technical expertise of a CFH is of value on each shift because of the differences in their training programs and experience. A CFH typically has greater experience than an NLO who was not trained and qualified as a CFH. A situation can arise at any time that may warrant the presence of someone with knowledge of the facility's technical specifications and the condition and limitations in the facility's license. Because predicting when an abnormal event or a human error may occur and how quickly an accident will develop is not possible, more detailed knowledge, experience, and training of a CFH would be helpful to other NLOs on site in the event of an emergency.

In consideration of the information above, the NRC staff recommends developing regulatory guidance regarding minimum staffing levels of CFHs and NLOs for decommissioning reactors similar to the requirements currently found in 10 CFR 50.54(m). Consistent with the graded approach to emergency preparedness, as described in Appendix A, "Emergency Preparedness," to this document, the minimum staffing guidance would address Level 1 (post-shutdown emergency plan) and Level 2 (permanently defueled emergency plan) stages of decommissioning. The CFH and NLO positions should not be neccessary after all spent fuel has been transferred to dry storage (i.e., Level 3, independent spent fuel storage installation (ISFSI)-only emergency plan) because the fuel is stored in a static condition. An NLO would not need to be available to conduct routine field surveillance rounds, and a CFH would not need to be available for each control room on site to supervise and coordinate work activities and to be available for staffing the control room to respond to events or incidents.

Another staffing position required for operating reactors is the shift technical advisor (STA). The STA provides engineering expertise on shift for assisting in the diagnosis of complex problems with structures, systems, and components during reactor operation. This staffing requirement is not relevant to a decommissioning plant and is typically removed through a license amendment from the decommissioning plant technical specifications. However, the current regulations do not address the acceptability of discontinuing the STA training program and removing the STA

position from the minimum staffing requirements in the technical specifications for decommissioning facilities. Therefore, clarification of this issue is necessary.

3.2 Training for Certified Fuel Handlers

Because the CFH is defined as an NLO, the NRC staff has evaluated the CFH training program in accordance with 10 CFR 50.120, which includes a requirement in 10 CFR 50.120(b)(2) that the training program must be derived from an SAT, 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 staff 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 staff has determined that a CFH program should address the three objectives described in Section 2.2 that are beyond those already prescribed in 10 CFR 50.120(b)(2) and (b)(3).

To accomplish this, the NRC staff recommends revising the definition of a CFH in 10 CFR 50.2 to establish criteria for an acceptable fuel handler training program. Explicit criteria 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. In doing so, the NRC staff would codify the existing practice of ensuring that the fuel handler training program suitable to qualify a CFH addresses the three objectives described in Section 2.2. The NRC staff can inspect the implementation of training programs suitable to qualify NLOs and CFHs using existing inspection procedures (IPs), such as IP 41501, “Review of Training and Qualification Programs,” dated April 27, 2016.

4 RULEMAKING OPTIONS

4.1 Option 1: No Action

4.1.1 Description of Option 1

This option would retain the current wording of the staffing and CFH-related regulations. The interpretation of the operator staffing requirements in 10 CFR 50.54(m) and training requirements in 10 CFR 50.120 could justify discontinuing the training and use of licensed operators after permanent cessation of operation and removal of fuel from the reactor. The regulations state, in part, that “the training program must be periodically evaluated and revised as appropriate to reflect...changes to the facility, procedures, regulations.” The regulations at 10 CFR 50.54(y) require that, when a licensee takes reasonable action that departs from a license condition or a technical specification, the action shall be approved “by a licensed senior operator, or, at a nuclear power reactor facility for which the certifications required under 10 CFR 50.82(a)(1) or 52.110(a) have been submitted, by either a licensed senior operator or a certified fuel handler, prior to taking the action.” This language is sufficiently broad to allow decommissioning reactors to use CFHs instead of licensed operators.

4.1.2 Assessment of Option 1

The no-action option would not result in any significant additional cost or burden to licensees and the NRC if decommissioning technical specifications were kept for staffing requirements consistent with current practice, as reflected in recent precedents. The NRC staff would continue to review, on a case-by-case basis, the staffing requirements proposed in the license amendment requests submitted by the licensees to provide reasonable assurance of adequate protection of public health and safety. Because the regulations do not specify minimum staffing levels by NLOs for decommissioning reactors, complex reviews would be necessary if licensees propose more relaxed NLO staffing requirements than those established by current practice.

4.2 Option 2: Voluntary Industry Initiatives To Provide Staff and Training for Permanently Shutdown and Defueled Reactors and To Clarify Related Definitions

4.2.1 Description of Option 2

In this option, the NRC staff would consider reviewing voluntary industry initiatives that may provide guidance on the responsibilities of the CFH, minimum staffing for a decommissioning nuclear reactor licensee, and the structure and contents of a fuel handler training program that can be used to qualify a CFH that the NRC staff would find acceptable. This alternative would not eliminate the need for licensees to submit license amendment requests that would allow them to use NLOs and CFHs instead of licensed operators and senior operators for operator shift staffing at a decommissioning plant.

The NRC staff notes that, although regulatory guidance exists that addresses acceptable methods of meeting the requirements for qualification and training of various categories of personnel, including the NLO (e.g., Regulatory Guide 1.8, “Qualification and Training of Personnel for Nuclear Power Plants,” and NUREG-1220, “Training Review Criteria and Procedures,” Revision 1, issued January 1993), none of the existing regulatory guidance specifically addresses fuel handler training programs suitable to qualify a CFH.

4.2.2 Assessment of Option 2

This option would clarify the intent of the 1996 decommissioning rulemaking, which defined the CFH position without providing clear details on the minimum staffing and training requirements for CFHs. The NRC staff’s position is that 10 CFR 50.120 covers the training requirements for NLOs during decommissioning. Licensees have requested, and the NRC staff has reviewed and approved, proposed CFH training programs using, in part, the requirements in 10 CFR 50.120. However, the regulations do not require that the fuel handler training program address the objectives of ensuring the safe conduct of decommissioning activities, safe handling and storage of spent fuel, and appropriate response to plant emergencies that, in the NRC staff’s position, are the necessary attributes of a fuel-handling training program that would be acceptable to qualify a CFH. If proposed voluntary industry initiatives are consistent with existing regulatory practices, the NRC does not anticipate any burden or increased cost beyond what is currently expected for decommissioning plants.

The NRC staff notes that the Nuclear Energy Institute (NEI) has issued draft industry guidance on the CFH training program in NEI 15-04, “Guidelines for a Certified Fuel Handler Training and

Retraining Program," Revision 0, dated November 3, 2015 (ADAMS Accession No. ML15350A145). The staff has not formally reviewed draft NEI 15-04 for potential endorsement through a regulatory guide. The NRC staff also notes that, to date, the industry has not proposed any voluntary initiatives in regard to the minimum staffing requirements for permanently shutdown and defueled reactors.

4.3 Option 3: Change the Regulations for the Definition of CFHs and Provide Guidance Regarding Minimum Staffing by CFHs and NLOs for Decommissioning Reactors

4.3.1 Description of Option 3

In this option, the NRC staff would clarify that a decommissioning nuclear power reactor would not require the STA training program thereby eliminating the need for an STA position.

Furthermore, the rulemaking option would revise the definition of "certified fuel handler" in 10 CFR 50.2, retaining the existing definition of the CFH and adding a voluntary alternative to: (1) clarify the management role of the CFH in a manner consistent with 10 CFR 50.54(y); (2) eliminate the need for a licensee to seek the Commission's approval for fuel handler training programs suitable to qualify a CFH; and (3) add a provision that 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, thereby creating consistency with the existing requirements in 10 CFR 50.120 for training NLOs.

The recommended regulatory changes would be consistent with established precedents that the NRC staff has approved on a case-by-case basis for permanently shutdown and defueled reactors.

As discussed in Section 3.1, because 10 CFR 50.54(m) does not apply to decommissioning reactors, in this option the NRC staff would provide guidance regarding acceptable minimum staffing by CFHs and NLOs, in a format similar to the minimum staffing requirements for licensed operators and senior operators described in the table in 10 CFR 50.54(m). The guidance regarding minimum staffing levels would be consistent with established precedents that the NRC staff has approved on a case-by-case basis for decommissioning reactors. The NRC staff would recommend that there be a CFH for each control room established at a permanently shutdown reactor site and an NLO for each permanently shutdown reactor unit on the site or, as discussed in Appendix B, "Physical Security," of this document, the licensee-designated vital area that has been relocated and is separate from the control room. An NLO should be available for each permanently shutdown reactor unit on site to conduct routine field surveillance rounds. A CFH should be available for each control room on site to supervise and coordinate work activities and to respond to events or incidents, if necessary. The CFH should not be restricted to the control room as long as another operator is present in the control room during his or her absence. The NRC staff would recommend in the guidance that the minimum staffing requirements apply during Level 1 (the post shutdown emergency plan) and Level 2 (the permanently defueled emergency plan) stages of decommissioning. Licensees could eliminate the CFH and NLO positions after all spent fuel has been transferred to dry storage (i.e., Level 3, ISFSI-only emergency plan).

4.3.2 Assessment of Option 3

This rulemaking option would provide a voluntary alternative definition for the CFH, which would clarify the CFH's responsibilities and functions and would add specific requirements for fuel handler training programs suitable to qualify CFHs by codifying current licensing practices. In addition to the recommended rulemaking, guidance would be provided regarding the minimum staffing by NLOs, including CFHs, for decommissioning nuclear power plants. The rulemaking option could reduce resources expended by both the licensee and the NRC staff associated with the preparation, submittal, regulatory review, and approval of licensing actions involving NLO staffing and the approval of training programs suitable to qualify CFHs, if the licensee chooses to implement the staffing guidance or voluntary alternative definition, respectively. The combination of rulemaking and guidance in this area would support the principles of good regulation, including clarity, efficiency, and reliability.

5 REGULATORY SCOPE

The recommended rulemaking would include revisions to the definition of a CFH in 10 CFR 50.2. The revision to the definition of a CFH in 10 CFR 50.2 would provide a voluntary alternative to the existing definition, which would clarify the responsibilities of the CFH, add specific requirements for fuel handler training programs suitable to qualify a CFH, and eliminate the need for a licensee to seek the Commission's approval for fuel handler training programs suitable to qualify a CFH.

In addition, the recommended rulemaking would clarify that licensed operators are not required for a decommissioning reactor and the NRC staff would provide guidance on the minimum staffing by CFHs and other NLOs. Further, through rulemaking, the NRC staff would also clarify that a decommissioning nuclear power reactor does not require the STA position.

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

6.1 NRC Guidance

The NRC staff finds that, because of a sufficiently large number of approved precedents (i.e., approved training programs suitable to qualify a CFH and license amendments issued for decommissioning reactors), developing a regulatory guide is not required to support the recommended rulemaking. However, the NRC staff would provide guidance for acceptable minimum staffing levels of NLOs and CFHs for decommissioning reactors, similar to the format of the requirements currently found in 10 CFR 50.54(m).

Additionally, the NRC staff would consider reviewing NEI's draft industry guidance document, NEI 15-04, for potential endorsement by a regulatory guide.

6.2 Policy Issues

No specific policy issues are associated with the recommended amendments to regulations for CFHs or other NLOs at decommissioning power reactors.

6.3 Implementation Issues

No specific implementation issues are associated with the recommended amendments to regulations for CFHs at decommissioning power reactors.

7 IMPACTS OF RECOMMENDED RULEMAKING

This section provides an analysis of the "no-action" alternative, the use of voluntary industry initiatives, and the rulemaking option. Option 1 is the "no-action" alternative and involves the continuation of current decommissioning practices. Option 2 is an alternative in which the NRC staff would review any voluntary industry initiatives, such as guidance to clarify the intent of the 1996 decommissioning rulemaking that defined the CFH position without providing clear details on the minimum staffing and training requirements for CFHs and other NLOs. Option 3 is a rulemaking approach that would provide a voluntary alternative for the definition of the CFH and guidance regarding minimum staffing by NLOs and CFHs at decommissioning power reactors.

7.1 Option 1: No Action

Under this option, the NRC staff would continue with the existing decommissioning process as described in the current regulations and guidance.

7.1.1 Impacts on Public Health, Safety, and Security

Because this option would not change the current process, there would be no increase or reduction in public health, safety, and security.

7.1.2 Impacts on Licensees

Because of the lack of clarity in the regulations with regard to the staffing alternative for licensed operators, after a reactor has been decommissioned and in the absence of regulatory requirements for CFH and NLO minimum staffing for decommissioning plants, the NRC staff will continue to review (1) fuel handler training and retraining programs suitable to qualify CFHs, (2) license amendment requests (e.g., Administrative Controls technical specifications and Defueled technical specifications), and (3) exemptions, on a case-by-case basis. Although this option would have no incremental impact on licensees, licensees would incur continued expenditures associated with the preparation of such submittals.

7.1.3 Impacts on the NRC

This option would have no incremental impact on the NRC. However, the NRC staff would continue to expend resources associated with the review of (1) fuel handler training and retraining programs suitable to qualify CFHs, (2) license amendment requests (e.g., Administrative Controls technical specifications and Defueled technical specifications), and (3) exemptions, on a case-by-case basis.

7.1.4 Additional Considerations

This option would have no incremental impact on State, local, or Tribal governments.

7.1.5 Summary of Benefits and Costs

This option would not provide incremental benefits or result in incremental costs to licensees or the NRC. However, licensees and the NRC staff would continue to carry the burden associated with preparation and regulatory review of (1) fuel handler training and retraining programs suitable to qualify CFHs, (2) license amendment requests (e.g., Administrative Controls technical specifications and Defueled technical specifications), and (3) exemptions, on a case-by-case basis.

7.2 Option 2: Voluntary Industry Initiatives for Staffing and Training for Permanently Shutdown and Defueled Reactors and Related Definitions

Under this option, the NRC staff would review any proposed voluntary industry initiatives, such as guidance regarding CFH training programs and staffing at decommissioning power reactors. The NRC staff notes that NEI has issued draft industry guidance regarding the CFH training program in NEI 15-04. In addition, the NRC staff notes that, to date, the industry has not proposed any voluntary initiatives in regard to the minimum staffing requirements for decommissioned reactors.

7.2.1 Impacts on Public Health, Safety, and Security

This option would have no impact on public health, safety, and security. The existing regulations would be maintained under this option.

7.2.2 Impacts on Licensees

This option could provide benefits to licensees by establishing guidance that would clarify the NRC staff's criteria for acceptable fuel handler training programs suitable to qualify a CFH and staffing for decommissioning reactors. This may lead to small-to-modest operational savings to licensees, primarily because consistent application of such guidance may reduce the complexity and level of effort needed to review these requests. As a result, licensees would incur savings (e.g., by needing to respond to fewer requests for additional information (RAIs)). Further, the burden associated with preparing fuel handler training programs suitable to qualify a CFH and license amendment requests related to staffing at decommissioning power reactors would decrease because the preparation of such submittals would be streamlined.

7.2.3 Impacts on the NRC

Overall, this option would result in one-time costs to the NRC. Initially, the NRC would incur incremental costs for the review of any voluntary industry initiatives, such as guidance regarding fuel handler training programs suitable to qualify a CFH. These costs include the review of documents submitted to the NRC staff, public meetings with stakeholders during the development stages of the regulatory guidance, and publication of the draft and final regulatory guidance, if appropriate. The costs would include both NRC staff and contractor time to develop guidance and perform supporting analyses and public outreach efforts during the guidance development phase. The NRC would also save resources similar to those described in Section 7.2.2 associated with reviewing license amendment requests.

7.2.4 Additional Considerations

This option would have no incremental impact on State, local, or Tribal governments.

7.2.5 Summary of Benefits and Costs

The NRC staff notes that this approach would promote uniformity and standardization for fuel handler training programs suitable to qualify a CFH. Specifically, because the regulations do not specify the three objectives (the safe conduct of decommissioning activities, safe handling and storage of spent fuel, and appropriate response to plant emergencies) that the NRC staff has determined to be necessary for issuance of approval for fuel handler training programs suitable to qualify CFHs, voluntary industry initiatives may be useful in describing these objectives.

Development and implementation of voluntary industry initiatives would result in a one-time cost to industry, and the NRC would incur a one-time cost to review any proposed voluntary industry initiatives and to consider endorsement through NRC guidance.

7.3 Option 3: Change the Regulations for the Definition of CFHs and Provide Guidance Regarding Minimum Staffing by CFHs and NLOs for Decommissioning Reactors

As stated in Section 4.3.1 of this appendix, under this option, the NRC staff would undertake a rulemaking to revise the definition of "certified fuel handler" in 10 CFR 50.2, retaining the existing definition of the CFH and adding a voluntary alternative to: (1) clarify the management role of the CFH in a manner consistent with 10 CFR 50.54(y); (2) eliminate the need for a licensee to seek the Commission's approval for fuel handler training programs suitable to qualify a CFH; and (3) add a provision that 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, thereby creating consistency with the existing requirements in 10 CFR 50.120 for training NLOs. The NRC staff would also clarify that a decommissioning nuclear power reactor would not require the STA training program, thereby eliminating the need for an STA position.

In addition, guidance would be provided regarding minimum staffing requirements for NLOs and CFHs at decommissioning power reactors.

7.3.1 Impacts on Public Health, Safety, and Security

This option would have no impact on public health, safety, and security. Under this option, the NRC staff would continue to have reasonable assurance of adequate protection of the public health and safety resulting from licensees' compliance with the regulations.

7.3.2 Impacts on Licensees

Licensees could incur savings since the proposed rulemaking would eliminate the need to seek the Commission's approval for fuel handler training programs suitable to qualify CFHs if licensees choose to use the definition of a CFH that the voluntary alternative would provide.

Specific to license amendment reviews, this option may reduce the the complexity and level of effort needed to review these programs. Under this option, the NRC staff will recommend guidance regarding acceptable minimum staffing for NLOs and CFHs, similar in format to the existing requirements in 10 CFR 50.54(m). The recommended guidance will be largely developed using approved precedents (i.e., approved training programs suitable to qualify a CFH and license amendments issued for decommissioning reactors). Should licensees use the recommended guidance when developing their decommissioning staffing levels and requesting changes to the section of their technical specifications titled, "Administrative Controls," that addresses the minimum staffing and qualifications of operations staff, the NRC staff would likely have fewer questions about those license amendment requests than they have had with previous similar license amendment requests. Licensees would incur savings associated with this less complex review (e.g., by responding to fewer RAIs).

The overall burden to licensees associated with preparing training programs suitable to qualify CFHs or license amendment requests related to staffing at decommissioning power reactors should not be significant because the preparation of such documents would be streamlined.

Licensees would also incur costs associated with NRC inspection activities intended to verify appropriate implementation of the rule. Such inspections can be performed concurrently with other inspections that would be conducted at decommissioning facilities; therefore, any such increase in burden and cost to the licensees would be small.

7.3.3 Impacts on the NRC

The NRC would incur incremental costs to undertake the rulemaking and guidance development for this portion of the power reactor decommissioning rulemaking. The costs associated with the preparation of the proposed rule would include: (1) NRC staff and contractor time to prepare proposed rule language, draft guidance, supporting analyses (e.g., a regulatory analysis and Office of Management and Budget paperwork burden analysis), and a *Federal Register* notice and (2) public outreach efforts during the rulemaking process. Public outreach efforts include those related to public meetings such as staff organization of the meetings and attendance. After publishing the proposed rule, the NRC would incur costs associated with public comment resolution and preparation of the final rule and supporting documentation.

After the final rule becomes effective, the NRC staff would incur savings because its review and approval of fuel handler training programs suitable to qualify CFHs would not be necessary. The NRC staff would expend some resources to inspect CFH training programs after their implementation by licensees during the decommissioning process. Existing inspection procedures, such as IP 41501, might be used to conduct such inspections. The burden and costs associated with such inspections should be much smaller than those currently being expended on reviews of fuel handler training programs suitable to qualify CFHs on a case-by-case basis. The NRC would also save resources similar to those described in Section 7.3.2 associated with reviewing license amendment requests related to staffing at decommissioning power reactors.

7.3.4 Additional Considerations

The proposed rule would have no incremental impact on State, local, or Tribal governments.

7.3.5 Summary of Benefits and Costs

The benefits of the rulemaking option include reduced burden and cost savings to licensees because the regulations would include a voluntary alternative to the definition of a CFH that would eliminate the requirement for licensees to seek the Commission's approval of their fuel handler training programs suitable to qualify a CFH. The added benefits include reduced burden to the NRC staff because staff would no longer need to review fuel handler training programs suitable to qualify a CFH.

Licensees entering decommissioning would still need to submit license amendment requests to modify their technical specifications to replace licensed operators and senior operators with shift staffing consisting of NLOs and CFHs. However, should the licensees use the recommended guidance that the NRC staff will provide with this rule, it would result in reduced burden to the NRC and cost savings to licensees associated with the lower complexity and level of effort needed to review these requests.

This option would result in a one-time cost to the NRC for developing the rule relative to the status quo.

8 BACKFITTING AND ISSUE FINALITY CONSIDERATIONS

The change to the definition of a CFH in 10 CFR 50.2 as described in Option 3, would not meet the definition of "backfitting" in 10 CFR 50.109, "Backfitting," or be inconsistent with issue finality regulations in 10 CFR Part 52 because this change would be a voluntary alternative that permits, but does not require, compliance with an alternative to current requirements.

The recommended change to 10 CFR 50.54(m) to clarify that the STA position is not required for a decommissioning reactor would not be considered backfitting or be inconsistent with issue finality regulations because the change would clarify the existing staff position and would not change the existing regulatory requirements.

9 NRC OBSERVATIONS ON STAKEHOLDER FEEDBACK ON DRAFT REGULATORY BASIS

9.1 Feedback from the Public Meeting

The NRC received one question from a stakeholder regarding whether a licensee in the late stages of decommissioning process would have to continue to comply with the minimum staffing and training requirements as proposed by the NRC staff in Appendix E, Option 3, if the rulemaking option is chosen. The NRC staff indicated that the questions pertained to activities related to transitioning from SFP storage to ISFSI storage, rather than transitioning from power reactor operations to decommissioning. The NRC staff further stated that the subject-matter experts in that area were not present and therefore, were unable to answer those questions at the meeting.

The NRC staff considered this question and agrees to clarify in its Option 3 that guidance will be recommended regarding minimum staffing levels of CFHs and NLOs for decommissioning reactors similar to the requirements currently found in 10 CFR 50.54(m). As stated in section 3.1 of this appendix, consistent with the graded approach to emergency preparedness, as

described in Appendix A to this document, the minimum staffing guidance would address Level 1 (post-shutdown emergency plan) and Level 2 (permanently defueled emergency plan) stages of decommissioning. Therefore, the CFH and NLO positions should not be necessary after all spent fuel has been transferred to dry storage (i.e., Level 3, ISFSI-only emergency plan) because the fuel is stored in a static condition. An NLO will not need to be available to conduct routine field surveillance rounds, and a CFH will not need to be available for each control room on site to supervise and coordinate work activities or for staffing the control room to respond to events or incidents.

9.2 Main Themes from Public Comment Submittals

The NRC received several public comment submittals regarding the minimum staffing and training requirements by NLOs, including CFHs. The NRC staff considered all of the comments when developing the options presented in this appendix. The comments received covered three main themes:

(1) need for rulemaking
(2) title of fuel handlers
(3) time period during which the requirements would apply

9.2.1 The Need for Rulemaking

Several commenters expressed their support of the rulemaking option, stating that Option 3 would ensure that the regulations would more appropriately reflect the responsibilities of the CFH and establish minimum CFH and NLO staffing requirements. Further, one commenter noted that the rule can and should explicitly address the minimum staffing and training requirements for CFHs. In addition, one commenter expressed support of standardization of CFH training and retraining programs because this would lead to an overall regulatory consistency among the decommissioning plants and would incorporate CFH training requirements into the rule. The NRC staff did not receive any comments that opposed the rulemaking option.

NRC Response

The NRC staff notes that standardization and improved consistency can be achieved by revising the definition of a CFH in 10 CFR 50.2, as described in Option 3.

9.2.2 The Title of Fuel Handlers

One commenter suggested that the NRC consider renaming the CFH as a “certified fuel manager,” “fuel management supervisor,” or “decommissioning shift manager,” as discussed in SECY-00-0145.

NRC Response

The NRC staff evaluated this comment and concluded that this terminology is widely adopted by the industry and that there would be no benefit in renaming the CFH. The NRC staff has approved a large number of fuel handler training programs suitable to qualify a CFH that have been approved since the issuance of SECY-00-0145 on June 28, 2000. In addition, licensees entering the decommissioning process in the past few years have requested the use of the term

"certified fuel handler" in their technical specifications (e.g., Dominion Energy Kewaunee, Inc., ADAMS Accession No. ML14104A046; Florida Power Corporation, Inc., ADAMS Accession No. ML14155A181; Southern California Edison, ADAMS Accession No. ML13268A165).

9.2.3 The Time Period during Which the Requirements Would Apply

One commenter proposed that, where applicable, the recommended rule changes specify the time period during which the requirements would apply. The commenter suggested that the CFH and NLO should not be required after all spent fuel has been transferred to dry storage (at Level 3, as defined in Appendix A) because the fuel is stored in a static condition. The commenter further expressed support for specifying the minimum staffing requirements for plants that enter decommissioning (Levels 1 and 2, as defined in Appendix A).

NRC Response

The NRC agrees with the comment's proposed approach because after the spent fuel has been transferred to dry storage, it is in a static condition; therefore, the duties that the NLO and CFH would perform, such as conducting routine field surveillance rounds or supervising and coordinating work activities, would not be necessary.

10 STAFF RECOMMENDATION

The NRC staff recognizes that the risks to public health and safety associated with SFPs are significantly lower than those associated with an operating plant and that no adverse safety impacts have been identified related to the training of CFHs and staffing of decommissioning facilities by NLOs and CFHs. However, the staff concludes that the following exist:

- a lack of clarity in the regulations and the subsequent reliance on licensees' technical specifications with respect to minimum staffing requirements for staff at permanently shutdown and defueled reactors

- an inconsistency in the regulatory treatment of training programs for NLOs (which do not require Commission approval) and training programs that can be used to qualify NLOs as CFHs (which do require the Commission's approval)

The NRC staff further notes that the regulations lack clarity in regard to which requirements, in addition to those stipulated in 10 CFR 50.120(b)(2) and (b)(3), an acceptable fuel handler training program for qualifying CFHs would have to meet for approval by the Commission.

The NRC staff has reviewed licensee submittals for plants entering the decommissioning process from the past few years, including approvals of licensee fuel handler training programs suitable to qualify a CFH (e.g., Entergy Nuclear Operations, Inc., ADAMS Accession No. ML14162A209; Exelon Generation Company, LLC, ADAMS Accession No. ML16222A787; Entergy Nuclear Operations, Inc., ADAMS Accession No. ML16259A347), and amendments to licenses of decommissioning facilities that include changes to the "Administrative Controls" section of the technical specifications that address the minimum staffing and qualifications of operations staff (Duke Energy Florida, Inc., et al., ADAMS Accession No. ML14097A145; Southern California Edison Company, et al., ADAMS Accession No. ML14183B240; Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc., ADAMS Accession No. ML14217A072; and Exelon Generation Company, LLC., ADAMS Accession No.

ML16235A413). Based on the results of these reviews and with consideration of the feedback received from the public on the draft regulatory basis, the NRC staff recommends proceeding with the Option 3, which will closely align with these recent approvals.

To summarize, the NRC staff is considering revisions to the existing regulations that would do the following:

- Clarify that an STA training program is not required for decommissioning reactors, thereby eliminating the STA position.

- Clarify the management role of the CFH in a manner that is consistent with 10 CFR 50.54(y) and with the NRC staff's interpretation of SECY-00-0145.

- Revise the definition of a CFH in 10 CFR 50.2 to provide a voluntary alternative that would eliminate the need for licensees to seek the Commission's approval for fuel handler training programs and add 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.

Further, the NRC staff is recommending guidance regarding acceptable minimum staffing levels of NLOs and CFHs at decommissioning reactors, in a format similar to the staffing levels currently found in 10 CFR 50.54(m) for operating plants.

APPENDIX F
DECOMMISSIONING FUNDING ASSURANCE

CONTENTS

1 INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) requires nuclear power plant licensees to provide reasonable assurance that funds will be available for decommissioning (commonly referred to as "radiological decommissioning"). An element of this assurance is the requirement for licensees at the time of licensing and throughout operations to provide decommissioning funding assurance in an amount which may be more, but not less, than the formula amount defined in the table of minimum amounts in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.75(c). The table of minimum amounts was established in 1988 as a means to ensure that the bulk of funds needed for decommissioning would be available. The requirement in 10 CFR 50.75(c) also defines a process for adjusting the formula amount from 1986 dollars to current year dollars. The NRC uses the formula and adjustment factors to periodically assess the adequacy of the financial assurance methods used by licensees, including decommissioning trust funds (DTFs). Also, the NRC and licensees use the formula as a benchmark that a site-specific cost estimate (SSCE) must meet or exceed.

In the regulatory basis, the staff is recommending changes to the regulations that addess the licensee's use of DTFs. The primary intent of these changes is to provide the NRC with continued assurance that sufficient funding remains available for decommissioning while reducing the need for regulatory exemptions with respect to the use of DTFs by licensees. The proposed change would allow, under certain circumstances, DTFs to be used for spent fuel management expenses and specifically licensed independent spent fuel storage installation (ISFSI) decommissioning expenses. This approach would codify current practice reflected in regulatory guidance, generic communications, and NRC precedent. Based on the staff's consideration of the public comments received on the draft regulatory basis, the NRC has made a few changes to its initial recommendation in the draft regulatory basis regarding licensees' use of DTFs. Overall, the agency anticipates that this rulemaking would provide the NRC and its stakeholders with greater (1) regulatory certainty through clarification of its DTF requirements, (2) openness and transparency about a licensee's legitimate use of the DTF and expectations for funding assurance, and (3) consistency such that reporting requirements for power reactors are aligned with those of ISFSIs.

2 EXISTING REGULATORY FRAMEWORK

2.1 History of Decommissioning Trust Funds

"Decommission," as defined in 10 CFR 50.2, "Definitions," means "to remove a facility or site safely from service and reduce residual radioactivity to a level that permits[:] (1) [r]elease of the property for unrestricted use and termination of the license; or (2) [r]elease of the property under restricted conditions and termination of the license." Under 10 CFR 50.75, "Reporting and recordkeeping for decommissioning flanning," power reactor licensees and applicants must certify that financial assurance for decommissioning has been (for licensees) or will be (for applicants) provided in an amount greater than or equal to either the amount provided by the Commission's regulations (i.e., the formula amount under 10 CFR 50.75(c)) or a site-specific amount based on a cost estimate for decommissioning the facility (i.e., the SSCE amount under 10 CFR 50.82(a)(4)(i) or 10 CFR 50.82(a)(8)(iii)). This amount must be covered by one or more of the methods described in 10 CFR 50.75(e), which are: (1) prepayment; (2) external sinking fund in an account segregated from licensee assets and outside the administrative control of the licensee and its subsidiaries or affiliates; (3) surety bond, insurance, or parent company guarantee; (4) a statement of intent (for applicable Government agencies); (5) contractual

obligation on the part of the licensee's customers; or (6) any other mechanism, or combination of mechanisms, as determined by the NRC to be equivalent to items 1 through 5. The purpose of these requirements is to provide reasonable assurance that sufficient funds will be available for the decommissioning process.

In the "Financial Assurance Requirements for Decommissioning Nuclear Power Reactors" final rule (Volume 63 of the *Federal Register* (FR), page 50465 (63 FR 50465); September 22, 1998), the NRC added the requirements currently in 10 CFR 50.75(f)(1) and (f)(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 31 of every other year or annually for plants that are within 5 years of entering decommissioning. This report must specify the assumptions that underlie the licensee's decommissioning funding assurance and must include:

> the amount of decommissioning funds estimated to be required pursuant to 10 CFR 50.75(b) and (c); 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…; 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.

The NRC addressed the circumstances in which licensees do not meet 10 CFR 50.75 in Regulatory Guide (RG) 1.159, Revision 2, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML112160012). This guidance states that licensees should make up shortfalls in funding within 2 years. However, since the issuance of the RG, the NRC has further refined its expectations. The regulations may not specify clearly enough that decommissioning funding assurance be maintained throughout all phases of the plant's life. Therefore, the staff is recommending in this regulatory basis to amend the regulation at 10 CFR 50.75(b) to state clearly that licensees must maintain decommissioning funding assurance as well as correct any shortfalls in a timely manner and provide evidence of this to the NRC during the next reporting cycle.

On December 24, 2002, the NRC published a final rule titled, "Decommissioning Trust Provisions," which amended 10 CFR 50.75 (67 FR 78332); the rule became effective on December 24, 2003. This rule change required licensees that were no longer rate-regulated or that no longer had access to a non-bypassable charge for decommissioning to establish decommissioning trust agreements in a form acceptable to the NRC in order to increase reasonable assurance that an adequate amount of decommissioning funds will be available. In October 2003, the NRC issued Revision 1 to RG 1.159 (ADAMS Accession No. ML032790365) to provide guidance on the revised regulations. RG 1.159 includes explanations, definitions, and examples of documents related to the financial assurance process, including recommended language for use in DTF and financial guarantee documents. The amended regulations and the revised RG 1.159 take into account the trend of transferring ownership of nuclear generating facilities from electric utilities to non-regulated entities and the resulting reduction in regulatory oversight by State oversight entities (e.g., Public Utilities Commissions) and the Federal Energy Regulatory Commission.

The guidance in RG 1.159, Revision 2, contains provisions that specifically apply to non-regulated entities (e.g., Sections 2.2.2.5 and 2.2.3.2) and the recommended format for DTF documents and letters of financial assurance to be submitted to the NRC. In addition, RG 1.159, Revision 2, indicates that electric utilities are allowed to take credit for a 2-percent annual rate of return (the difference between the assumed rate of return and the escalation rate for the cost of radiological decommissioning) in making their financial assurance determinations.

Funding assurance requirements for decommissioning under 10 CFR 50.75 are different than those for spent fuel management under 10 CFR 50.54(bb). Under 10 CFR 50.54(bb), licensees are required to submit written notifications to the Commission for its review and preliminary approval of the program by which the licensee intends to manage and provide funding for the management of all irradiated fuel at the reactor following permanent cessation of operation of the reactor until title to the irradiated fuel and possession of the fuel is transferred to the Secretary of Energy for ultimate disposal of the fuel in a repository. This notification is required within 2 years following permanent cessation of operation of the reactor or 5 years before expiration of the reactor operating license, whichever occurs first,

2.2 Commingling of Funds

Some licensees have created separate subaccounts in their DTFs for funding activities that do not fall within the definition of "decommission" in 10 CFR 50.2. The NRC allows such commingling of funds within a DTF to address such expenses as site restoration costs and spent fuel management costs, as long as the licensee is able to identify and separately account for the NRC-required decommissioning funds that are contained within the DTF. The practice of commingling is generally permitted under NRC guidance (see Regulatory Issue Summary (RIS) 2001-07, Revision 1, "10 CFR 50.75 Reporting and Recordkeeping for Decommissioning Planning," dated January 8, 2009 (ADAMS Accession No. ML083440158)).

2.3 Table of Minimum Amounts

Under 10 CFR 50.75(b)(1), the NRC requires a licensee to certify that it will provide financial assurance for decommissioning in an amount that may be more, but not less, than the amount stated in the table of minimum amounts in 10 CFR 50.75(c). The table of minimum amounts does not represent the actual cost of decommissioning for specific reactors. Instead, it is a reference level established to ensure that the licensee demonstrates adequate financial responsibility, in that the bulk of the funds necessary for a safe decommissioning are being considered and planned for early in the facility's life. This provides reasonable assurance that the facility would not become a risk to public health and safety when it is decommissioned (53 FR 24018, 24030; June 27, 1988). In 1986 dollars, the minimum amount for a pressurized-water reactor was $105 million, and the minimum amount for a boiling-water reactor was $135 million. This amount covers only the cost of the radiological decommissioning of a nuclear generating plant and excludes the cost of expenditures such as restoring the property to its original condition (i.e., "green-fielding") or managing spent fuel. The $105 million and $135 million cost numbers are escalated each year to reflect changes in the costs of labor, energy, and waste burial (10 CFR 50.75(c)(2)). The guidance in NUREG-1307, "Report on Waste Burial Charges: Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities," as amended, updates the escalation factors to be used biennially and adjusts the results (in dollars) to the current year, thus ensuring the continued validity of the formula. The NRC staff published Revision 16 to NUREG-1307 in March 2017 (ADAMS Accession No. ML17060A362) to address additional considerations affecting the formula (e.g., new

low-level radioactive waste (LLW) disposal capacity and a reassessment of the assumptions for LLW classification) and clarify the guidance.

The NRC staff evaluated the adequacy of the table of minimum amounts by considering a draft Pacific Northwest National Laboratory (PNNL) study titled "Assessment of the Adequacy of the 10 CFR 50.75(c) Minimum Decommissioning Fund Formula," dated November 2011 (ADAMS Accession No. ML13063A190). The NRC staff presented its findings to the Commission in SECY-13-0066, "Staff Findings on the Table of Minimum Amounts Required to Demonstrate Decommissioning Funding Assurance," dated June 20, 2013 (ADAMS Accession No. ML13127A234). While the PNNL study recommended rebalancing the formula, the NRC staff's review of this information and its comparison of calculations using both the rebalanced and existing formulas led it to conclude that the minimum formula successfully established "a common minimum standard measurement, or reference level, to which each licensee must accumulate committed financial resources during the life of the operating license as it was intended…." On February 27, 2013, the NRC held a public meeting (ADAMS Accession No. ML13014A378) where this conclusion, which highlighted the PNNL study, was discussed with external stakeholders. During the meeting, participants indicated that the Table of Minimum Amounts could successfully accomplish its purpose, and none of the participants advocated for its change.

2.4 Use of Decommissioning Trust Funds

Until final decommissioning has been completed, disbursements or payments from the DTF are restricted to decommissioning expenses or transfer to another financial assurance method acceptable under 10 CFR 50.75(e). The only exceptions are for payment of ordinary administrative costs (including taxes) and other incidental expenses of the fund (including legal, accounting, actuarial, and trustee expenses) in connection with the operation of the fund. Initially, 3 percent of the formula amount may be used for decommissioning planning. For licensees that have submitted the certifications required under 10 CFR 50.82(a)(1), and commencing 90 days after the NRC has received the post-shutdown decommissioning activities report (PSDAR), an additional 20 percent may be used. An SSCE must be submitted to the NRC prior to the licensee using any funding in excess of these amounts. Additionally, decommissioning trust funds may be used by licensees in decommissioning if: (1) the withdrawals are for expenses for legitimate decommissioning activities consistent with the definition of decommissioning in 10 CFR 50.2; (2) the expenditure would not reduce the value of the decommissioning trust below an amount necessary to place and maintain the reactor in a safe storage condition if unforeseen conditions or expenses arise and; (3) the withdrawals would not inhibit the ability of the licensee to complete funding of any shortfalls in the decommissioning trust needed to ensure the availability of funds to ultimately release the site and terminate the license. In order to use the DTF outside of these requirements, the licensee would have to request and the NRC would have to approve an exemption from these requirements.

2.5 Independent Spent Fuel Storage Installation Decommissioning

"Decommission" has the same definition in 10 CFR 72.3, "Definitions," with respect to ISFSIs as it does in 10 CFR 50.2 with respect to reactors. For ISFSIs, decommissioning involves reducing the residual radioactivity of the structures, systems, and components for spent fuel storage to a level that permits release of the property and termination of the license. Spent fuel management involves the safe and secure storage of all irradiated fuel at the reactor until title to

the irradiated fuel and possession of the fuel is transferred to the Secretary of Energy for ultimate disposal of the fuel in a repository.

Under 10 CFR 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. General licensees under 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," may use funds from their 10 CFR 50.75 DTFs to provide the financial assurance for ISFSI decommissioning because ISFSI decommissioning for general licensees is considered to be under the definition of decommission in 10 CFR 50.2 and the cost of decommissioning a generally licensed ISFSI is not a spent fuel management cost. Additionally, the statements of consideration for the 2011 Decommissioning Planning Rule (76 FR 35512, 35552; June 17, 2011) states that 10 CFR Part 72 general licensees are subject to 10 CFR Part 50 requirements for providing decommissioning financial assurance.

However, specific licensees under 10 CFR Part 72 are not subject to 10 CFR Part 50 requirements for providing decommissioning financial assurance and must obtain an exemption to use funds from their 10 CFR 50.75 DTFs to provide the financial assurance required by 10 CFR 72.30, "Financial assurance and recordkeeping for decommissioning," for ISFSI decommissioning. In other words, a generally licensed ISFSI may use the decommissioning funds collected under 10 CFR 50.75; however, a specifically licensed ISFSI would need to obtain a regulatory exemption to use the same decommissioning funds collected un"der 10 CFR 50.75.

2.6 Exemptions Granted

In transitioning from operations to a decommissioning status, licensees have asked to withdraw funds from the DTF to pay for spent fuel management—a use that does not fall within the definition of "decommission" in 10 CFR 50.2. When the DTF and spent fuel management funds have either not been commingled or have been commingled in a manner inconsistent with the guidance provided in RIS 2001-07, Revision 1, the staff has not been able to confirm whether the use of the DTF for spent fuel management would comply with DTF regulations. In these instances, licensees have submitted regulatory exemptions from 10 CFR 50.75 and 10 CFR 50.82, "Termination of license," for NRC approval. Based on the NRC staff's review to ensure compliance with the criteria in 10 CFR 50.12, "Specific exemptions," and that adequate funds remain available for decommissioning, the NRC staff has granted exemptions to enable licensees to use funds from the DTF for spent fuel management.

Specifically, the NRC has granted exemptions on a finding of reasonable assurance that sufficient funding will remain available in the DTF to complete decommissioning and upon a determination that the licensee meets the requirements in 10 CFR 50.12. The NRC will not consider exemptions under 10 CFR 50.12 for approval unless special circumstances exist and 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.

3 TECHNICAL BASIS FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

The NRC is undertaking this rulemaking to minimize the need for licensees to seek exemptions from decommissioning funding regulations at the commencement of decommissioning. One way to accomplish this would be by allowing DTF funds to be used for spent fuel management and decommissioning expenses for specifically licensed ISFSIs, as long as the licensee demonstrates reasonable assurance that sufficient funds will remain available for 10 CFR Part 50 decommissioning according to the licensee's SSCE.

Presently, allowable decommissioning expenses that may be funded from the DTF must be related to the planning for, and cleanup and removal of, radiologically contaminated structures and materials. Specifically, 10 CFR 50.82(a)(8)(i)(A) states that licensees can use DTFs if the withdrawals "are for expenses for legitimate decommissioning activities consistent with the definition of decommissioning in 10 CFR 50.2." In accordance with 10 CFR 50.2, "decommission" means "to remove a facility or site safely from service and reduce residual radioactivity to a level that permits[:] (1) [r]elease of the property for unrestricted use and termination of the license; or (2) [r]elease of the property under restricted conditions and termination of the license." Therefore, "legitimate decommissioning activities" include only those activities related to removing a nuclear facility or a site safely from service and reducing residual radioactivity to a level that permits license termination and release of the property for restricted or unrestricted use. The regulation does not address the use of funds accumulated in the DTF that are greater than those required for 10 CFR Part 50 decommissioning in accordance with the licensee's SSCE, except to indicate at 10 CFR 50.75(h)(1)(iv) that, after final decommissioning has been completed, withdrawals from the DTF are no longer restricted to decommissioning expenses. Thus, unless properly commingled, the DTF may not be used for spent fuel management and specifically licensed ISFSI decommissioning expenses, regardless of reasonable assurance by the licensee that sufficient funds would remain available for 10 CFR Part 50 decommissioning.

When accumulated funds are commingled in the DTF and are not distinctly identified, all of the funds are considered to be dedicated to decommissioning. As a result, the NRC does not allow the licensee to use those funds for expenses that do not fall within the definition of decommissioning in 10 CFR 50.2, such as for spent fuel management and specifically licensed ISFSI decommissioning expenses. Therefore, licensees have sought and been granted exemptions from 10 CFR 50.75 and 10 CFR 50.82 requirements to allow the use of DTFs to pay for expenses associated with spent fuel management, upon demonstrating that sufficient funds would remain for decommissioning.

The requirements in 10 CFR 50.75(f)(1) contain the requirements in 10 CFR 50.75(f)(2). Because this duplication serves no purpose, the NRC staff also recommends eliminating 10 CFR 50.75(f)(2). Additionally, the staff identified an opportunity for efficiency to align the biennial power reactor decommissioning funding reporting requirements under 10 CFR 50.75(f)(1) with the triennial ISFSI decommissioning funding reporting requirements under 10 CFR Part 72. In practice, some licensees attempt to combine these two reports. The NRC staff recommends that licensees be required to submit both reports every three years. The staff also identified that the decommissioning fund plans for ISFSIs under 10 CFR 72.30 have more stringent requirements than the decommissioning plans for operating reactors (i.e., PSDAR) because the former require NRC review and approval, whereas the latter do not. In this regard, the staff recommends removing the requirement for approval under

10 CFR 72.30(b) and (c). Alignment and synchronization between 10 CFR Part 50 and 10 CFR Part 72, as discussed above, will simplify the decommissioning funding regulatory reporting requirements for licensees of both operating reactors and ISFSIs.

The reliance on exemptions creates 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 its exemption request. The NRC staff must also divert resources from other agency activities in order to evaluate and approve each exemption request.

As discussed in SRM-SECY-14-0118, "Staff Requirements—SECY-14-0118—Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements," dated December 30, 2014 (ADAMS Accession No. ML14364A111), the Commission directed the NRC staff to proceed with a decommissioning rulemaking and to include in the rulemaking other issues that the NRC staff deemed to be relevant. Consistent with this Commission direction, the NRC staff included DTF issues within the scope of the power reactor decommissioning rulemaking.

Through this rulemaking effort, the NRC will seek to change the agency's regulations in order to minimize the need for licensees to request similar regulatory exemptions. Licensees would be allowed to use the DTF during decommissioning to the extent that it exceeds the SSCE contained in the PSDAR in order to pay for ancillary expenses related to decommissioning, but not falling under the definition of "decommission" in 10 CFR 50.2 (i.e., spent fuel management and specifically licensed ISFSI decommissioning expenses). Allowing withdrawals for these expenses during decommissioning in addition to withdrawals for decommissioning activities, to the extent that the DTF exceeds the SSCE, should eliminate the need for licensees to request regulatory exemptions from decommissioning funding regulations while maintaining reasonable assurance of decommissioning funding. These recommended changes would also better inform licensees of their options for using the DTF.

3.1 Summary of Justification for Recommended Changes

The NRC staff is recommending rulemaking to clarify the use of funds accumulated in the DTF that exceed the amount needed to decommission, as defined in 10 CFR 50.2. This change would minimize the need for exemptions from the decommissioning funding regulations while still maintaining reasonable assurance of decommissioning funding. This rulemaking is also intended to provide greater transparency by clarifying what expenses may be paid with DTFs and to introduce flexibility and transparency by allowing licensees to use funds in the DTF during decommissioning that exceed those needed to decommission as defined in 10 CFR 50.2 (i.e., spent fuel management and 10 CFR Part 72 specifically licensed ISFSI decommissioning expenses). Allowing DTF funds that exceed the amount needed for decommissioning to be used for such expenses would better reflect the current environment in which a permanent repository for spent fuel does not exist and licensees are required to provide long-term onsite storage of spent fuel in an ISFSI.

As established in 10 CFR 50.75 and 10 CFR 50.82, power reactor licensees are required to maintain a DTF throughout the 40-year operating license period, throughout the extended operating license period (if applicable), and throughout the period of decommissioning until license termination. The recommended changes would not undermine the underlying purpose of the rule, which is to ensure that sufficient funds remain available for the safe decommissioning of an NRC-licensed power reactor facility.

4 RULEMAKING OPTIONS

4.1 Option 1: No Action

4.1.1 Description of Option 1

This option would maintain the status quo and retain all current requirements found in 10 CFR 50.75 and 10 CFR 50.82 on decommissioning funding assurance.

4.1.2 NRC Assessment of Option 1

Under this option, licensees would still need to apply for exemptions to use the DTF for spent fuel management or specifically licensed ISFSI decommissioning expenses. The NRC would continue to review these exemptions on a case-by-case basis.

4.2 Option 2: Rulemaking

4.2.1 Description of Option 2

The NRC staff recommends making five changes to minimize exemptions and to reduce ambiguity in the DTF regulations:

1. Amend the regulations under 10 CFR 50.82 to allow the decommissioning funds collected and kept in an external trust under 10 CFR 50.75 to be used during decommissioning for spent fuel management, as well as for decommissioning of 10 CFR Part 72 specifically licensed ISFSIs. However, licensees must first apply the decommissioning funds collected to decommissioning activities as defined in 10 CFR 50.2. Thus, after a licensee submits its PSDAR, along with the certifications required under 10 CFR 50.82(a)(1)(i)-(ii), it would be allowed to use funds greater than those required for decommissioning for spent fuel management and specifically licensed ISFSI decommissioning expenses. The licensee would be required to continue to provide reasonable assurance that sufficient funds remain available for decommissioning under 10 CFR Part 50. Under these circumstances, licensees would not be required to seek a regulatory exemption under 10 CFR 50.12 to use the DTF in this manner.

2. Amend the regulations to modify the reporting requirements in 10 CFR 50.75(f)(1) to be consistent with the decommissioning funding assurance reporting requirements for ISFSIs in 10 CFR 72.30(c), which the NRC would also modify for conformity to align the submittal dates with those in 10 CFR 50.75. Additionally, remove the requirement for NRC approval of ISFSI reports filed under 10 CFR 72.30(b) and (c). Licensees would report the status of their decommissioning funding during operations on a triennial basis (every 3 years) instead of on a biennial basis.

3. Amend the regulation at 10 CFR 50.75(b) to clarify the requirement that licensees must maintain decommissioning funding assurance. Licensees would have to correct shortfalls in a timely manner and provide evidence of their correction to the NRC during the next reporting cycle under 10 CFR 50.75(f). A shortfall is the inability of the licensee to demonstrate reasonable assurance that adequate funds will be available. Current

guidance states that licensees may remedy shortfalls by using 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 in 10 CFR 50.75(c) or by a licensee's SSCE), thereby creating a shortfall.

4. Amend 10 CFR 50.75(h)(1)(iii)-(iv) and 10 CFR 50.75(h)(2) to be consistent with 10 CFR 50.4, "Written communications," with respect to the submission of notifications related to the DTF. This change would require licensees to send all such notifications to the NRC Document Control Desk instead of to the Director, Office of Nuclear Reactor Regulation; Director, Office of New Reactors; or Director, Office of Nuclear Material Safety and Safeguards, as applicable.

5. Eliminate 10 CFR 50.75(f)(2) because 10 CFR 50.75(f)(1) contains all of the text in 10 CFR 50.75(f)(2).

4.2.2 NRC Assessment of Option 2

The recommended regulatory changes in Option 2, if implemented, would reduce the need for exemption requests for future decommissioning funding assurance given that clear regulatory requirements would be in place to govern the appropriate use of the DTF. Upon entering the decommissioning phase of a power reactor's life (presuming the submittal of the certification of permanent cessation of operations and the certification that fuel has been permanently removed from the reactor vessel, the PSDAR, and the SSCE), a licensee would be able to use the DTF not only for expenses incurred toward 10 CFR Part 50 decommissioning, but also for spent fuel management and specifically licensed ISFSI decommissioning expenses without the added burden of seeking a regulatory exemption to the extent that the DTF contains funds greater than those required for 10 CFR Part 50 decommissioning. This use of the DTF for spent fuel management and specifically licensed ISFSI decommissioning expenses would only be permitted upon the licensee first demonstrating that there is sufficient funding for decommissioning, and licensees would continue to be required to maintain reasonable financial assurance for decommissioning. Licensees would not be required to use the DTF for spent fuel management and specifically licensed ISFSI decommissioning expenses. Instead, this proposed change would provide a measure of flexibility to a licensee for the use of funds in the DTF while maintaining appropriate regulatory oversight through the review of triennial reports during operations and annual reports during decommissioning.

Changing the reporting frequency during operations from a biennial to a triennial basis and removing the NRC approval requirement for ISFSI decommissioning funding reports would align the reporting requirements under 10 CFR 50.75 with the reporting requirements for ISFSI decommissioning funding under 10 CFR 72.30(b) and (c). This would reduce reporting burdens inherently associated with different reporting schedules and approval requirements.

Although the requirement to maintain decommissioning financial assurance already exists in 10 CFR 50.75 and 10 CFR 50.82, adding a provision that clearly states that licensees must correct financial assurance shortfalls reinforces reasonable assurance that decommissioning funds will be available and mitigates the potential negative impact of moving the reporting requirement during operations to a three-year period. Any financial assurance shortfall would need to be reported and corrected using any of the methods specified under 10 CFR 50.75(e)(1).

Amending the regulations at 10 CFR 50.75(h)(1)(iii)-(iv) and 10 CFR 50.75(h)(2) to be consistent with 10 CFR 50.4 with respect to the submission of notifications related to the DTF would provide greater consistency throughout NRC regulations.

Eliminating the duplication between 10 CFR 50.75(f)(1) and 10 CFR 50.75(f)(2) by deleting 10 CFR 50.75(f)(2) would streamline the NRC regulations without affecting the public health and safety. This action would correct an apparent duplication in NRC regulations.

5 REGULATORY SCOPE

The NRC staff would amend 10 CFR 50.75, 10 CFR 50.82, and 10 CFR 72.30, as applicable.

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

The NRC staff would amend, as appropriate, Regulatory Guide 1.159, Revision 2 (ADAMS Accession No. ML112160012); Regulatory Guide 1.185, Revision 1 (ADAMS Accession No. ML13140A038); NUREG 1577, Revision 1 (ADAMS Accession No. ML17033B536); NUREG/CR-0672; and NUREG/CR-5884 (ADAMS Accession No. ML14008A187). The NRC staff would also update RIS 2001-07, Revision 1, to reflect the recommended amended regulations in 10 CFR 50.82 to allow decommissioning funds collected and kept in an external trust under 10 CFR 50.75 to also be used for spent fuel management and 10 CFR Part 72 specifically licensed ISFISI decommissioning expenses to the extent that the trust contains funds greater than those required for 10 CFR Part 50 decommissioning. The NRC staff and stakeholders use these guidance documents for compliance with the affected regulations. Currently, these guidance documents do not reflect the ability of a licensee to use DTF funds for spent fuel management or 10 CFR Part 72 specifically licensed ISFSI decommissioning expenses without the approval of a regulatory exemption.

7 IMPACTS ON PUBLIC HEALTH, SAFETY, AND SECURITY

7.1 Option 1: No Action

7.1.1 Impacts on Public Health, Safety, and Security

Maintaining the status quo will have no impact on public health, safety, and security.

7.1.2 Impacts on Licensees

The burden would remain on the licensee to seek an exemption(s) from the decommissioning regulations.

7.1.3 Impacts on the NRC

The NRC staff would expend resources reviewing exemption requests on a case-by-case basis.

7.1.4 Additional Considerations

Consistent with the feedback from the comments received by the NRC on the draft regulatory basis, the regulations with respect to decommissioning funding assurance would remain non-transparent and unclear (e.g., rely on the guidance in RIS 2001-07, Revision 1).

7.1.5 Summary of Benefits and Costs

The benefit from taking no action would be the reduced staff time dedicated to rulemaking and the rulemaking process. The cost would continue as expenditures for both the licensee and the NRC staff in terms of exemption requests.

7.2 Option 2: Rulemaking

7.2.1 Impacts on Public Health, Safety, and Security

The rulemaking option would maintain the current level of public health, safety, and security.

7.2.2 Impacts on Licensees

Licensees would have less burden given the reduction or elimination of the need for submitting exemption requests to use the DTF for spent fuel management and specifically licensed ISFSI decommissioning expenses. In addition, licensees would have the opportunity to combine the submissions for DTF and ISFSI funding assurance on a triennial basis during operations. With respect to shortfalls, licensees would benefit from the regulations becoming more transparent and clear.

7.2.3 Impacts on the NRC

The NRC would have less burden in terms of the reduction or elimination of the need for reviewing exemption requests to use the DTF for spent fuel management and specifically licensed ISFSI decommissioning expenses.

7.2.4 Additional Considerations

The recommended changes would reduce the need for regulatory exemptions and would improve the regulatory process by making it more efficient and transparent while still maintaining reasonable assurance of decommissioning funding.

7.2.5 Summary of Benefits and Costs

Both the NRC staff and licensees would realize efficiencies through the reduction or elimination of exemptions. The regulatory language would also achieve greater clarity, thus leading to an increased understanding of the decommissioning funding assurance process.

8 BACKFITTING AND ISSUE FINALITY CONSIDERATIONS

Currently, the NRC does not anticipate that either of the options in this appendix, if implemented, would constitute backfitting under 10 CFR 50.109, “Backfitting,” or violate any

issue finality provision in 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." Option 1 would maintain the status quo of exemption requests, thereby imposing no change in requirements or NRC staff positions. Option 2 would allow, but not require, licensees to use the DTF for spent fuel management and 10 CFR Part 72 specifically licensed ISFSI decommissioning expenses, to the extent that the DTF contains funds greater than those required for 10 CFR Part 50 decommissioning. These changes would not constitute backfitting as defined in 10 CFR 50.109 or violate any issue finality provision under 10 CFR Part 52. In addition, Option 2 would clarify the 10 CFR 50.75(b) requirement for licensees to maintain decommissioning funding assurance. Consistent with current requirements, licensees would have to correct funding shortfalls in a timely manner. This amendment would maintain the current requirements and, as a result, would not constitute backfitting and would not be inconsistent with issue finality. The changes to the reporting requirements, such as the requirement to provide evidence to the NRC of the licensee's shortfall correction during the next reporting cycle under 10 CFR 50.75(f), and the administrative amendments under Option 2 would not fall within the purview of the backfitting and issue finality provisions.

9 NRC OBSERVATIONS ON STAKEHOLDER FEEDBACK ON THE DRAFT REGULATORY BASIS

9.1 Feedback from the Public Meeting

During the May 8–10, 2017, public meeting, the NRC staff received questions about DTFs and the proper use of DTFs by licensees. Although many of these questions fell outside of the scope of this rulemaking, they showed a lack of clarity with regard to the concept of commingling, how regulatory exemptions are reviewed with respect to DTFs, and how the NRC determines reasonable assurance that licensees will have the funds needed to decommission. In addition, attendees expressed great concern that the DTFs are underfunded and do not reflect the true cost of decommissioning for commercial nuclear power plants. The NRC staff considered these observations in preparing its recommendations.

9.2 Main Themes from Public Comment Submittals

During the public comment period for the draft regulatory basis, the NRC received approximately 27 comments directly related to Appendix F. Members of the industry predominantly commented that SSCEs should not replace the table of minimum amounts when considering funding assurance for DTFs because they believe that using SSCEs would not achieve greater accuracy. Members of the industry also commented that the option of using DTF funds in excess of the amount needed to decommission, for spent fuel management and specifically licensed ISFSI decommissioning, was desirable. State governments commented that excess DTF funds should not be allowed to be used for spent fuel management and specifically licensed ISFSI decommissioning expenses and that consideration should be given to requiring more accurate predictors of decommissioning costs. Other commenters indicated that the NRC should extend the purpose of DTFs to include site restoration with an accompanying increase in the funding requirements.

Previously, the NRC staff had proposed allowing licensees to use 1 percent of the total DTF amount to pay for expenses associated with decommissioning but that did not constitute 10 CFR Part 50 decommissioning expenses. The majority of the comments on this proposal were

from the industry. The commenters expressed some confusion as to how the proposal would work, but no opposition. These commenters requested that the NRC provide examples of the types of non-direct decommissioning expenses that the 1 percent proposal would cover and examples of how the reporting process would work. Comments from State and local government stakeholders did not directly address the 1 percent proposal but did reiterate the opinion that DTFs are underfunded and do not reflect the true cost of decommissioning.

NRC Response

The NRC staff agrees with the comments that requiring an SSCE in lieu of the minimum formula amount would not be beneficial because it would not add additional assurance that sufficient funds for decommissioning will be available compared to using the minimum formula amount. Additionally, the NRC staff recognizes that, although the purpose of the DTF is for 10 CFR Part 50 decommissioning, spent fuel management and specifically licensed ISFSI decommissioning are a part of the larger decommissioning process and are both activities within the regulatory authority of the NRC. Therefore, the NRC staff finds that it would be appropriate to allow those funds in the DTF that are greater than the funds necessary for 10 CFR Part 50 decommissioning to be used for spent fuel management and specifically licensed ISFSI decommissioning upon entering the decommissioning phase. Because site restoration is not an activity within the regulatory authority of the NRC, the NRC is not considering proposed changes to the DTF regulations to address site restoration. After consideration of the comments received regarding the 1 percent proposal, the NRC staff has determined that such a provision would add unnecessary confusion to the topic of decommissioning expenses, and therefore has withdrawn this proposal.

10 NRC RECOMMENDATION

The NRC recommends Option 2, including items 1 through 3, and the administrative changes outlined in items 4 and 5.

The NRC staff recognizes that while commingling is available as described in RIS 2001-07, Revision 1, the majority of licensees have chosen not to commingle funds. The majority of licensees plan to request exemptions instead of specifically identifying the use of funds greater than those required for 10 CFR Part 50 decommissioning in their DTFs. Proceeding via exemptions in this manner is inefficient. The NRC staff recommends addressing this issue by amending the regulations to allow, during decommissioning, licensees to access the funds in the DTF in excess of those required for 10 CFR Part 50 decommissioning, for spent fuel management and specifically licensed ISFSI decommissioning expenses. This would both maintain the integrity of the DTF for its purpose of decommissioning while also allowing licensees to fund additional steps in the NRC-regulated decommissioning process. Further, the NRC staff and licensees would realize efficiencies through the reduction or elimination of regulatory exemptions.

The NRC staff also identified inconsistencies in its regulations. The NRC staff recommends addressing these inconsistencies by changing the reporting requirements for decommissioning funding assurance in 10 CFR 50.75 from a biennial to a triennial reporting period during operations and by modifying 10 CFR 72.30(c) to align the report submittal dates with those in 10 CFR 50.75 (i.e., March 31). Based on the NRC staff's experience since 1999, the NRC staff has not found signficant problems that would not be identified and corrected under a triennial

reporting requirement. Accordingly, the staff expects a triennial reporting requirement to continue to provide reasonable assurance.

Finally, the NRC staff recognizes that the regulations do not include specific language that clearly states the requirement that decommissioning funding assurance be maintained throughout all phases of the plant's life. Therefore, the NRC staff recommends amending 10 CFR 50.75(b) to clearly state that licensees must maintain decommissioning funding assurance, as well as correct any funding shortfalls in a timely manner and provide evidence of their correction to the NRC during the next reporting cycle.

The NRC staff has also identified two additional administrative changes for clarification purposes: (1) eliminate 10 CFR 50.75(f)(2) because it is duplicated in 10 CFR 50.75(f)(1) and (2) modify 10 CFR 50.75(h)(1)(iii)-(iv) and 10 CFR 50.75(h)(2) to require that notifications related to the DTF be submitted to the Document Control Desk and thus make these reporting requirements consistent with other reporting requirements in 10 CFR Part 50.

APPENDIX G

OFFSITE AND ONSITE FINANCIAL PROTECTION REQUIREMENTS AND INDEMNITY AGREEMENTS

CONTENTS

1 INTRODUCTION

Section 170 of the Atomic Energy Act of 1954, as amended (AEA), is more commonly referred to as the Price-Anderson Act (PAA). The PAA grants the U.S. Nuclear Regulatory Commission (NRC) the authority to develop and enforce financial protection and indemnity regulations for its licensees.[18] The NRC implements the PAA through its regulations at Title 10 of the *Code of Federal Regulations* (10 CFR) Part 140, "Financial Protection Requirements and Indemnity Agreements." In addition to PAA financial protection regulations that focus on offsite consequences and potential liability from a commercial nuclear power plant radiological incident, the NRC also requires licensees to have onsite financial protection that focuses on onsite consequences, including stabilization of the reactor and decontamination of the reactor and reactor site.

While NRC regulations for operating reactors are robust, neither the PAA nor the NRC's financial protection regulations explicitly address decommissioning reactors that have ceased operations, defueled, and no longer have a rated power capacity. As a result, even though an operating reactor shuts down and begins to decommission, it must comply with regulations that are designed for an operating reactor. The licensees of a decommissioning reactor typically prepare and submit regulatory exemption requests that would allow them to be excluded from these requirements. To address this inefficiency, the NRC is recommending in this rulemaking an expansion of its financial protection regulations to cover the situation presented by a decommissioning reactor. These changes would provide regulatory certainty by minimizing the need for the licensees of decommissioning reactors to request regulatory exemptions for relief from requirements that should apply only to operating reactor licensees.

2 EXISTING REGULATORY FRAMEWORK

The NRC's financial protection regulations can be separated into three basic categories: (1) "offsite financial protection," which provides funds for the public's protection (also known as Price-Anderson insurance, or liability insurance); (2) government-sponsored "indemnity," which serves as a provisional no-fault liability insurance in an amount of up to $500 million; and (3) "onsite financial protection," which is used to stabilize the reactor and reactor site in the event of a nuclear incident (also known as property insurance). Price-Anderson insurance and indemnity are interrelated, while onsite financial protection is independent of the first two.

2.1 Offsite Financial Protection

Offsite financial protection is used to ensure that adequate funds are available to satisfy public liability claims in the event of a nuclear incident. As required by the regulations in 10 CFR 140.11(a)(4), large operating reactors with a rated capacity of 100,000 electrical kilowatts or more are required to have and maintain offsite financial protection that is derived from two sources: (1) primary financial protection equal to the maximum amount of liability insurance available from private sources (currently $450 million), and (2) secondary financial protection consisting of funds from a nuclear industry retrospective rating plan (a form of nuclear industry self-insurance in which the licensee of each nuclear reactor covered by the plan would be required to contribute up to approximately $121 million for each nuclear reactor in the event

[18] The regulations in 10 CFR 140.3, "Definitions," define the term "financial protection" as the ability to respond in damages for public liability and to meet the cost of investigating and defending claims and settling suits for such damages. For the purpose of this appendix, the NRC staff will use the term "financial protection" interchangeably with the term "insurance."

of a nuclear incident at any licensed facility covered by the plan). As of the publication of this document, the total amount of secondary financial protection is approximately $12.5 billion.

2.2 Indemnity

Under the context provided in this regulatory basis, indemnity is a form of government-sponsored insurance that is provided to NRC licensees in an amount of up to $500,000,000 for each reactor site. Pursuant to 10 CFR 140.20, "Indemnity agreements and liens," the NRC requires each licensee of a nuclear reactor to execute an agreement of indemnification. Under Section 170c of the AEA, government indemnification of up to $500 million is provisionally available for licensed facilities that are required to have less than $560 million in PAA insurance. As described above, the current combined amount of primary and secondary financial protection is $13 billion. As a result, operating reactors with a rated capacity of 100,000 electrical kilowatts or more are not eligible for the government indemnity. A decommissioning reactor, however, may become eligible to receive government indemnification once it receives a financial protection exemption and takes action to withdraw from the industry retrospective rating plan.

The agreement of indemnification is executed and issued when a license is granted and is maintained until the license is terminated. The general forms of indemnity agreements entered into by the Commission for large operating reactors can be found in 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."

2.3 Onsite Financial Protection

The NRC requires large operating power reactors to maintain onsite financial protection that would be used to stabilize the reactor and decontaminate the reactor and reactor site in the event of a nuclear incident. As required by 10 CFR 50.54(w), large operating reactors must have and maintain the lesser financial protection amount for each reactor site of either $1.06 billion or the amount of insurance that is generally available from private sources.

2.4 Development of the Current Financial Protection Exemption Process

Under 10 CFR Part 140 and 10 CFR 50.54(w), each power reactor licensee is required to have the maximum amounts of offsite and onsite financial protection, respectively. Licensees must maintain offsite and onsite financial protection until their license is terminated.

In the late 1980s and early 1990s, a series of premature shutdowns of large operating reactors led the NRC to consider legal and policy implications in the application of offsite and onsite financial protection requirements. At that time, the Rancho Seco, Shoreham, Yankee Rowe, San Onofre 1, Fort St. Vrain, and Trojan nuclear power plants were closing, and their licensees submitted requests to the NRC to be exempted from the full financial protection amounts required of an operating reactor under 10 CFR Part 140 and 10 CFR 50.54, "Conditions of licenses." The NRC considered Section 170b of the AEA, which states the following:

> [T]he Commission may establish a lesser amount [of financial protection] on the basis of criteria set forth in writing, which it may revise from time to time, taking into consideration such factors as the following: (A) the cost and terms of private

> insurance, (B) the type, size, and location of the licensed activity and other factors pertaining to the hazard, and (C) the nature and purpose of the licensed activity….

These exemption requests were based, in part, on analyses provided by the licensees of the risks and consequences of design-basis events and beyond-design-basis events at a decommissioning nuclear power reactor. The NRC staff captured its analysis of these exemption requests in a series of Commission papers (SECY-93-127, "Financial Protection Required of Licensees of Large Nuclear Power Plants During Decommissioning," dated May 10, 1993 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12257A628); SECY-96-256, "Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11," dated December 17, 1996 (ADAMS Accession No. ML15062A483); SECY-97-186, "Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11," dated August 13, 1997 (ADAMS Accession No. ML12263A676); SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," dated June 28, 2000 (ADAMS Accession No. 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 (ADAMS Accession No. ML011450420); and SECY-04-0176, "Exemption Request 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)—henceforth referred to as the "Commission paper series"). As described in these papers, potential offsite and onsite radiological consequences could be associated with the onsite storage of the spent fuel in the spent fuel pool (SFP) in the time after permanent shutdown. The most significant event sequence for a permanently defueled and shutdown reactor is a beyond-design-basis event that involves the complete loss of water from an SFP. In this scenario, decay heat could potentially overheat the fuel. This beyond-design-basis event sequence could result in a zirconium fuel cladding fire that could propagate through the spent fuel storage pool and result in an offsite release of radioactive materials.

The exemption requests contained an analysis that demonstrated that the licensee's spent fuel could be sufficiently air cooled to avoid zircaloy cladding combustion when the analysis was bound by very specific Brookhaven National Laboratory studies that employ very specific parameters and conservative assumptions (such as high-density fuel racking geometries, high-burnup fuel, 60,000 megawatt days per metric ton of uranium (MWD/MTU) for pressurized-water reactors (PWRs) and 40,000 MWD/MTU for boiling-water reactors (BWRs), and postulated incipient spent fuel clad failure at 565 degrees Celsius (C)). To prevent fuel rod cladding failure leading to a zircaloy cladding fire, given the loss of all SFP water, the rod cladding temperature must not exceed 565 degrees C. Based on the identified assumptions and information at that time, a cladding temperature of 565 degrees C would not be exceeded after a decay period after reactor shutdown of approximately 7 months for BWRs and 17 months for PWRs. This standard is henceforth referred to as the "air-coolable" scenario.

With this in mind, the NRC exercised its discretional authority by allowing decommissioning reactors to lower their offsite primary financial protection from $200 million (the maximum amount of financial protection available at the time) to $100 million and to withdraw from the industry retrospective rating plan. Similarly, the NRC allowed decommissioning reactors to reduce the amount of onsite financial protection from $1.06 billion to $50 million. The agency found that $100 million and $50 million for offsite and onsite financial protection, respectively,

would be adequate to cover any expenses that could potentially arise from a nuclear incident at a decommissioning reactor site.

Recently, the NRC issued similar exemptions to three licensees in decommissioning ("Duke Energy Florida, Inc. Crystal River, Unit 3; Exemption," Volume 81 of the *Federal Register* (FR), page 18652 (81 FR 18652), March 31, 2016; "Dominion Energy Kewaunee, Inc.; Kewaunee Power Station; Exemption," 80 FR 19697, April 13, 2015; and "Entergy Nuclear Operations, Inc.; Vermont Yankee Nuclear Power Station; Exemption," 81 FR 24136, April 25, 2016). The NRCrelied, in part, on a different calculation showing that the risk of a zirconium fire is very low. This approach assumed no heat transfer could occur out of the spent fuel cladding and that, once the spent fuel is uncovered, it would take at least 10 hours for the cladding to reach a temperature where the zirconium exothermic reaction would begin. This time period would be sufficient for personnel to respond with various mitigative measures to restore cooling to the SFP. This is a more conservative assumption than the air-coolable scenario in terms of the worst-case configuration that could occur following a severe event in the SFP. This scenario is henceforth referred to as the "10-hour scenario."

3 TECHNICAL BASES FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

3.1 Fuel Standard

In granting each of the financial protection exemptions, the NRC concluded that the risk associated with the limiting event—a beyond-design-basis zirconium fire—was sufficiently low to warrant the reduction in insurance coverage. The "air-coolable" standard demonstrated that the spent fuel decay heat was sufficiently low that the spent fuel could be air cooled, should the SFP be drained through some severe event, and that, as a result of the air cooling, there was an extremely low likelihood that the spent fuel cladding could reach a temperature where the zirconium exothermic reaction would begin. The "10-hour" standard demonstrated that the spent fuel cladding would not reach a temperature resulting in a potential offsite release for at least 10 hours after the loss of all means of cooling and that the 10 hours would be adequate to restore cooling to the SFP. Both calculations are ways of showing that the zirconium fire risk is very small, once the spent fuel has reached a sufficiently low decay heat level, and that, as a result, there is a basis for reducing the insurance requirements.

Since issuance of the Commission paper series, the NRC has provided spent fuel studies that have superseded the studies considered for the original technical basis. For example, NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," issued February 2001 (ADAMS Accession No. ML010430066), explains that the "air-cooled" standard that is used as the insurance technical basis, and which proposes indefinite fuel cooling, cannot actually guarantee that SFP fires will not occur (even though the associated risk is very low). Specifically, NUREG-1738 states the following:

> The analysis in this study…indicates that a zirconium fire cannot be precluded on a generic basis even after 5 years decay. This is because a spent fuel configuration necessary to assure air cooling cannot be assured following a severe earthquake or cask drop event that drains the pool. Since a criteria of "sufficient cooling to preclude a fire" cannot be met and the long-term consequences could be significant…, the [NRC] staff will need to consider alternative criteria if changes to insurance requirements are to be pursued.

In other words, NUREG-1738 notes that SFP configurations can be transformed, perhaps as a result of an extreme earthquake that effectively shut off heat transfer (i.e., no air cooling), and begin to approximate an adiabatic heatup of the spent fuel cladding. Thus, from a bounding and conservative perspective of precluding a zirconium fire, the NRC determined that the air-coolable standard did not exclude all possible scenarios. Accordingly, recent exemption approvals have considered both air-coolable and 10-hour adiabatic heatup calculations to support reaching a conclusion that the exemption could be granted and insurance requirements reduced.

As a practical matter, the staff recognizes that the insurance exemption process may be able to adopt the technical basis used in the emergency preparedness (EP) exemption process (i.e., the 10-hour scenario) and thereby simplify the regulatory process by eliminating the air-coolable calculation. Although the staff continues to assess the path forward, it currently views the 10-hour adiabatic heatup calculation as an adequate basis for reducing insurance requirements.

3.2 The Basis for the Reduced Financial Protection Amounts

The NRC staff has examined the origin of the $100 million and $50 million values for offsite and onsite financial protection, respectively, as summarized below.

Offsite Financial Protection

In SECY-93-127, the NRC staff acknowledged that the reduced insurance amounts that were chosen would require a thorough examination and stated, “Because the level of primary financial protection after a cooling period relates primarily to offsite actions in response to perceived, rather than an actual hazard, the staff concludes that rulemaking to establish the appropriate level should be pursued.” The NRC recognized that rulemaking was necessary to develop an appropriate method for assessing the amount of financial protection required of a decommissioning reactor. In the interim, it allowed for regulatory exemptions in the amount of $100 million for offsite financial protection—“a level which would not prejudice the outcome of the rulemaking.”

The reduced offsite financial protection amount of $100 million originated in SECY-93-127, in which the staff concluded that “the liability claims experience of Three Mile Island Unit 2 [TMI-2] provides a reasonable basis for determining the liability insurance coverage level appropriate for permanently shutdown reactors that have completed their respective spent fuel cooling periods.” At the time, the amount of financial payouts from the PAA amounted to approximately $70 million. The reduced financial protection amount was subsequently rounded up and set at $100 million. Thus, this reduced insurance amount was not based on a detailed quantitative analysis.

In SECY-04-0176, the NRC staff consolidated the NRC’s numerous efforts to address financial protection requirements for decommissioning reactors. The Commission’s associated staff requirements memorandum (SRM) for SECY-04-0176, dated October 29, 2004 (ADAMS Accession No. ML043030459), directed the staff to “work with stakeholders to encourage industry development of an appropriate methodology for assessing financial risk that could be applied to the storage of spent fuel in either a spent fuel pool or an independent spent fuel storage installation. This methodology…can assist the staff in preparing well-developed recommendations that can be presented to the Commission.”

The staff communicated with the nuclear power industry to develop the methodology described in the Commission direction. However, due to changing priorities, work was delayed on the tasking. In 2007, the Nuclear Energy Institute (NEI) stated that the industry believed that this issue changes over time and that it would be 10–15 years before the issue warranted being revisited, because that was when the next group of reactors were expected to decommission (ADAMS Accession No. ML070880620). Ten years have passed from the date of that NEI comment. The timing is appropriate to revisit this issue and validate whether a sound technical basis exists for reduced financial protection amounts in decommissioning as a part of this rulemaking. This basis will inform all future reduced amounts of financial protection.

In SECY-93-127, 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 the rulemaking. The staff believes that a level of $100 million would be adequate." In SRM-SECY-93-127, dated July 13, 1993 (ADAMS Accession No. ML003760936), the Commission found this amount to provide adequate coverage. However, the NRC conceived the $100 million figure as a temporary standard to facilitate exemption requests.

Accordingly, the staff is recommending $100 million while determining whether adjustments are necessary.

Onsite Financial Protection

For many of the same reasons identified for offsite financial protection, the staff is considering the adequacy of the reduced onsite financial protection amount as part of this rulemaking. The reduced onsite financial protection amount of $50 million originated in a rulemaking plan attached to SECY-96-256, which states the following:

> The postulated accident scenario for [the air-coolable scenario] is assumed to be a single assembly dropped in the spent fuel pool, resulting in damage to 100 percent of the rods in the affected assembly. The onsite cleanup costs are estimated from $9 to 24 million… However, if there are significant sources of radioactive material stored onsite, then it would be appropriate to have a higher level of onsite insurance coverage… Taking the conservative approach, a scenario of the rupture of a large liquid radwaste storage tank…was selected as conceivable…[and] was estimated to result in an onsite waste cleanup cost of approximately $50 million with negligible radiological consequences offsite. In economic terms, it surpassed the cleanup costs associated with a fuel handling accident discussed above and it has been taken into account in determining the upper-bound level of onsite insurance coverage required in [the air-coolable scenario].

Accordingly, the NRC staff is recommending a requirement of $50 million for onsite protection while determining whether adjustments are necessary.

4 RULEMAKING OPTIONS

4.1 Option 1: No Action

4.1.1 Description of Option 1

The "no action" option would require licensees of decommissioning reactors to maintain the full offsite and onsite financial protection specified in 10 CFR 140.11, "Amounts of financial protection for certain reactors," and 10 CFR 50.54(w), respectively. Relief from regulatory requirements could only be granted by the NRC on a case-by-case basis through the exemption process.

4.1.2 NRC Assessment

One objective of the power reactor decommissioning rulemaking is to codify and amend regulations as necessary to allow operating reactors to safely transition to a decommissioning status without pursuing regulatory exemptions. The staff does not consider this to be a viable option because it does not support the intent of the rulemaking.

4.2 Option 2: Two-Step Graded Approach

4.2.1 Description of Option 2

Option 2 would allow certain licensees in decommissioning to reduce the insurance amounts they are required to maintain without obtaining exemptions from the NRC's regulations. Instead, once certain criteria are satisfied, licensees could reduce their financial protection to the amounts in Level 2 of Table 1.

Table 1 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; ≥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, "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 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 will take place. 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. Maintaining this level of insurance recognizes the potential for insurance claims following an accident in the spent fuel pool, even though the event is unlikely.

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 (radwaste), 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 (the standard recommended in Appendix A to the regulatory basis for relaxation of offsite EP requirements).

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 TMI-2.

If significant sources of radioactive material remain on site, as described above, 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 radwaste 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.

4.2.2 NRC Assessment

The two-step graded approach aligns a decrease in risk, as supported by the spent fuel cooling analyses discussed in Section 3 of this appendix, with a corresponding reduction in financial protection requirements. Codifying the two-step graded approach would support the intent of the rulemaking effort. Additionally, this option would rely on a process that considers NRC precedent in approving prior exemptions. The amounts of financial protection provided in Levels 1 and 2 are consistent with exemptions that have been granted to decommissioned and decommissioning reactors in the past. The staff considers this to be a viable option because it supports the intent of the rulemaking.

4.3 Option 3: Four-Step Graded Approach

4.3.1 Description of Option 3

The Commission paper series proposed a "four-step graded approach" that considers decreasing nuclear power plant risk with corresponding reductions in financial protection requirements. This earlier graded approach includes two further reductions in financial protection beyond the two-step graded approach described in Option 2. These additional levels correspond to reductions in risk during a plant's decommissioning progression. Although the four levels described in this appendix appear similar to the graded EP levels described in Appendix A, they are different in that the levels within this appendix consider onsite consequences that may be triggered by an onsite event. Table 2 summarizes this option:

Table 2 Four-Step Graded Approach

Level	Description	Offsite Requirement	Onsite Requirement
1	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 radwaste	$100 million; withdrawal from the rating plan	$50 million
3	All Spent Fuel Transferred to an Onsite Independent Spent Fuel Storage Installation (ISFSI) or Removed From the Site; ≥ 1,000 Gallons of Radwaste	$50 million	$50 million
4	All Spent Fuel Transferred to an Onsite ISFSI or Removed From the Site; < 1,000 Gallons of Radwaste	$25 million	$25 million/ eliminated

Description of Levels 1 and 2

Levels 1 and 2 are identical to the two-step graded approach discussed in Section 4.2 of this appendix.

Description of Level 3: All Spent Fuel Transferred to an Onsite Independent Spent Fuel Storage Installation or Removed from Site; ≥ 1,000 gallons of radwaste onsite

In Level 3, the reactor is permanently shut down and all spent fuel has been removed to an onsite or offsite ISFSI, or to a U.S. Department of Energy (DOE) high-level waste repository. The remaining onsite radioactive inventory depends on the reactor and reactor site decommissioning status and may include liquid radwaste, radioactive reactor components, and contaminated structural materials. In these circumstances, with no fuel in the SFP, the risk of an incident resulting in a release of radioactivity materials is greatly reduced from that of Level 2.

When spent fuel is no longer stored in the SFP at a permanently shutdown reactor site, the potential for a radiological incident is primarily assumed to be in mobile sources of radioactivity. Because the spent fuel has been removed from the SFP, the NRC recommends further reducing the required level of offsite financial protection to take into account only the mobile radioactive inventory that may remain on site. The offsite financial protection requirement would be reduced to $50 million since the level of risk is considered less than in Level 2.

In Level 3, onsite financial protection recognizes there is no fuel in the SFP and the risk is dependent on the radioactive inventory remaining at the reactor site. As was the case for Level 2, the level of onsite financial protection would be based on the estimated amount needed to recover from the postulated onsite event of a rupture of a large (about 450,000 gallons) slightly contaminated liquid storage tank and cleanup from this event. Therefore, the onsite financial protection would be maintained at $50 million.

Description of Level 4: All Spent Fuel Transferred to an Onsite Independent Spent Fuel Storage Installation or Removed from Site; ≤ 1,000 gallons of radwaste onsite

A licensee in Level 4 is similarly situated as a licensee in Level 3, except that the reactor site no longer has any significant amount of mobile sources of radioactivity, such as contaminated liquids (less than 1,000 gallons). Therefore, the basis for the transition from Level 3 to Level 4 is the point at which less than 1,000 gallons of liquid radwaste are stored onsite. Because there are no significant amounts of mobile radioactive sources on site, there is no need to maintain the Level 3 amounts of offsite and onsite financial protection.

Under the PAA, offsite financial protection must be maintained for licenses issued under Sections 103 and 104 of the AEA. Under the NRC's regulations, and for the purpose of this rulemaking, this would include all power reactor licenses under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities;" licenses under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants;" and licenses under 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." Thus, while offsite consequences in Level 4 are considered negligible, offsite financial protection must be maintained until the NRC license is terminated. As provided in SECY-96-256, the Level 4 offsite requirement would be reduced to $25 million because of the possibility for public liability claims arising from alleged offsite consequences stemming from an onsite nuclear incident.

Pursuant to SECY-96-256, for onsite financial protection, the postulated rupture of the much smaller radioactive storage tank of less than 1,000 gallons is estimated to have at least two orders of magnitude less impact than the rupture of the large tank, such that onsite cleanup costs would not necessitate the level of coverage specified in Level 3. Onsite coverage would be reduced to $25 million. This amount is considered to be sufficient to cover cleanup activities of the smaller storage tank. Elimination of onsite insurance coverage could be warranted when a licensee has completed all decommissioning activities other than a confirmatory survey for license termination.

4.3.2 NRC Assessment

Codifying the four-step graded approach would support the intent of the rulemaking effort. Additionally, this option would recognize the staff's previous rulemaking efforts described in the Commission paper series, while also considering the full scope of the decommissioning process through license termination. The amounts of financial protection provided in Levels 1 and 2 are

consistent with exemptions that have been granted to decommissioned and decommissioning reactors in the past.

The technical bases for the amounts of financial protection provided in Levels 3 and 4 proposed in the Commission paper series have not been thoroughly reviewed by the NRC staff or fully vetted with stakeholders. Therefore, at this time, the staff does not recommend this option. However, the NRC staff recognizes the benefits of such a proposal. In this regard, the NRC staff is currently reviewing the technical basis for each of the four levels, the proposed amounts of financial protection, and the significance of government-sponsored indemnity and its applicability to a decommissioning reactor.

5 REGULATORY SCOPE

Option 1, "no action," would not involve any changes to the regulations, and thus, it is not further considered here. The recommended financial protection requirements under Options 2 and 3 would codify the approach used in exemptions issued to date and provide a graded reduction approach, where requirements for decommissioning sites are adjusted commensurate with the level of risk posed within each stage of the decommissioning process. The recommended financial protection requirements would include revisions to multiple sections of 10 CFR Part 140 for offsite insurance and 10 CFR 50.54(w) for onsite insurance. These revisions could address numerous regulatory topics, including, but not limited to, scope and applicability, amounts of financial protection, technical bases, and indemnity implications.

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

6.1 NRC Guidance

At this time, the NRC staff anticipates crafting regulatory text that is sufficiently clear so that implementation guidance is not needed. The staff notes that the NRC does not currently have any guidance for the financial protection or indemnity program. The NRC staff is developing this program guidance separate from the decommissioning rulemaking.

6.2 Policy

Policy considerations for this appendix include, but are not limited to, the monetary and technical bases used to evaluate the transition between levels for both offsite and onsite insurance, as well as potential regulatory disparities between ISFSIs that are licensed under 10 CFR Part 50 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."

6.2.1 Financial Protection Adjustments for Inflation

The reduced financial protection exemption amounts that are provided in 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 to maintain their intended purchasing power. If the agency chooses to adjust these figures for inflation, the NRC staff believes that subsequent inflation adjustments should be made in 5-year increments to coincide with the PAA inflation adjustments required in Section 170t of the AEA.

6.2.2 Independent Spent Fuel Storage Installations

In SECY-04-0176, the NRC staff evaluated exemption requests from four decommissioning reactors (Trojan, Yankee Rowe, Maine Yankee, and Big Rock Point) after all spent fuel had been transferred from the SFP to an onsite ISFSI. The licensees of these reactors submitted exemption requests that attempted to reduce their required offsite insurance amount from $100 million to $25 million. The associated SRM to SECY-04-0176 ultimately denied the exemption requests and tasked the NRC staff with the "development of an appropriate methodology for assessing financial risk that could be applied to the storage of spent fuel in…an independent spent fuel storage installation." Additionally, in SRM-SECY-96-256, the Commission "requested that the [NRC] staff determine whether there is a need for financial protection for ISFSIs…."

Many of the Commission papers referenced in SECY-04-0176 considered the discrepancy that exists between those ISFSIs that were licensed under 10 CFR Part 72 and those that were licensed under 10 CFR Part 50. In SECY-04-0176, the NRC staff recognized that the "ISFSI regulations in 10 CFR Part 72 do not require any insurance or financial liability protection for ISFSIs. The [NRC] staff acknowledges that there is little technical difference between a generally-licensed ISFSI at a decommissioning reactor under the requirements of Part 50 and a stand-alone, specifically-licensed ISFSI under the requirements of Part 72." Through these statements, the staff recognized that, as a reactor site decommissions, it eventually becomes an ISFSI on a 10 CFR Part 50-licensed reactor site. This 10 CFR Part 50-licensed ISFSI is virtually the same as an ISFSI that was specifically licensed under 10 CFR Part 72 and that was never associated with a reactor. Both ISFSIs are technically similar, but the 10 CFR Part 50 ISFSI is required to maintain insurance, while the 10 CFR Part 72 ISFSI has no insurance requirements.

Thus, at that time, the NRC staff believed that similarities between 10 CFR Part 50 and 10 CFR Part 72 ISFSIs would call for similar treatment, that is, if a 10 CFR Part 50 decommissioning reactor site that contains an ISFSI requires insurance, then a 10 CFR Part 72 ISFSI should also require insurance. Support for the proposal of ISFSI requirements includes the following:

- From SECY-93-127:

  It should be noted that continuing a requirement for financial protection after the spent fuel has cooled sufficiently to avoid concern for zirconium cladding fires would not be fully consistent with the decision not to require financial protection for [ISFSIs] licensed pursuant to 10 CFR Part 72…. Because the level of primary financial protection after a cooling period relates primarily to offsite actions in response to perceived, rather than an actual hazard, the [NRC] staff concludes that rulemaking to establish the appropriate level should be pursued. Development of such a rule should consider whether shutdown reactors with cooled spent fuel should be treated differently from ISFSIs or whether ISFSI licensees should provide some financial protection consistent with the level chosen for licensees of shutdown nuclear power plants.

- From SECY-04-0176:

  [T]he [NRC] staff believes that public health and safety risk may not be the only appropriate measure for making a determination on an appropriate level of liability insurance. Liability insurance covers financial and legal risks that extend well beyond

any radiological damages that may occur from an incident at a particular site. The [NRC] staff notes that the current primary insurance level of $100 million for most decommissioning reactors was not based solely on public health and safety risk, but instead was established considering claims resulting from the TMI-2 accident—both actual claims paid and the cost of defending such claims. More than $70 million has been paid to date for the TMI-2 accident, even though no significant offsite radiological release occurred.

- From SECY-96-256:

  [F]or offsite financial protection requirements, even though the offsite consequences are negligible, adequate coverage would still be required because of the litigious nature of our society….The insurance coverage requirements are based on the estimated cost of recovery from limiting hypothetical events for [the four levels of decommissioning] and due to intangible elements related to the assumption that claims by members of the public might be filed for offsite consequences from nuclear energy hazards. TMI-2 has shown that significant amounts can be involved (settlements in the TMI case) even though the offsite consequences were negligible.

The financial protection Commission paper series (described above) recommends that offsite financial protection be provided for an ISFSI to cover potential liability claims, even in the absence of a conceivable nuclear incident that could result in an offsite radiological release. An inadvertent disparity exists, insofar as an ISFSI licensed under 10 CFR Part 50 must maintain some level of financial protection, but an ISFSI licensed under 10 CFR Part 72 does not. The NRC staff is also aware that the development of 10 CFR Part 72 financial protection requirements may, or may not, address centralized interim storage facilities. The NRC staff is currently exploring the available options to address this policy implication under the rulemaking.

6.3 Implementation

At this time, the NRC staff does not anticipate any implementation issues.

7 IMPACTS

The recommended changes in this regulatory basis appear to be beneficial to both licensees and the NRC staff because they clarify the requirements for financial protection of decommissioning plants, provide for regulatory certainty, and reduce regulatory burden without affecting the adequate protection of public health and safety. These changes are also beneficial to members of the public: they help to clarify the process by which licensees may reduce the amounts of financial protection in decommissioning and promote openness, since this process will be codified. In general, the public comments provided on this rulemaking (and further discussed in Section 9, “NRC Observations on Stakeholder Feedback on Draft Regulatory Basis”) reflect the sentiment that licensees should not be allowed to reduce insurance amounts.

7.1 Option 1: No Action

Under this option, the NRC staff would continue to implement the current financial protection exemption process, as discussed under Section 4.1 of this appendix. The NRC staff would not implement a rulemaking pursuing any changes to the current process.

7.1.1 Impact on Public Health, Safety, and Security

Option 1 would not change the current regulatory exemption process. As a result, impacts on public health, safety, and security would remain unchanged.

7.1.2 Impacts on NRC Licensees

Option 1 would have no incremental impact on licensees, as they would continue to be subject to the administrative and monetary burden associated with a regulatory exemption. Cost reductions in insurance premiums may be delayed because of the timeliness issues associated with processing and approving the exemption. This may also indirectly contribute to delays in the decommissioning process.

7.1.3 Impacts on the NRC

Option 1 would have no incremental impact on the NRC, as it would continue to review and process regulatory exemptions on a case-by-case basis. This continues the inefficiencies associated with NRC staff planning of resources and prioritization of work.

7.1.4 Additional Considerations

Option 1 would have no incremental impact on State, local, or Tribal governments.

7.1.5 Summary of Costs and Benefits

Option 1 would not provide any incremental costs or benefits to the NRC or its licensees.

7.2 Option 2: Two-Step Graded Approach

7.2.1 Impact on Public Health, Safety, and Security

In Option 2, the NRC staff would undertake a rulemaking to make the exemptions that the NRC has issued to some licensees generically applicable. The basis for the exemptions and the rulemaking is discussed in Section 4.2 of this appendix. Under Option 2, the NRC would reduce the amounts of insurance licensees must have to the same amounts resulting from exemptions issued under Option 1. Therefore, the impacts of Option 2 would be equivalent to the impacts of Option 1 and would result in no adverse impacts on public health, safety, or security.

7.2.2 Impacts on NRC Licensees

Option 2 would result in time and monetary savings for licensees, which would otherwise need to seek a regulatory exemption to reduce offsite and onsite financial protection amounts while decommissioning. Changes to the regulations would eliminate the need for exemption requests for decommissioning reactors. Licensees would no longer be required to undergo the administrative and monetary burden associated with the regulatory exemption request process, and would realize more timely reductions in insurance premiums. Licensees may also be able to expedite the decommissioning process by eliminating any delays associated with processing exemptions. If the recommended technical basis is adopted for insurance purposes, licensees would gain the added benefit of providing one (fuel) analysis to satisfy both EP and insurance reduction requirements.

7.2.3 Impacts on the NRC

Option 2 would result in an initial significant resource (time and money) investment followed by ongoing savings for the NRC. Initially, there would be incremental costs to the NRC to undertake the rulemaking process. These costs include the preparation of the proposed rule and supporting guidance development; specifically, NRC staff time to prepare proposed rule language, guidance, and supporting analyses and to conduct public outreach efforts. After publishing the proposed rule, the NRC would incur costs associated with public comment resolution and preparation of the final rule.

By implementing the current financial protection exemption process, the NRC would reduce the number of exemption requests submitted by licensees and reviewed by the NRC.

7.2.4 Additional Considerations

There are no additional considerations for this option.

7.2.5 Summary of Costs and Benefits

Under Option 2, the NRC would incur the initial cost of rulemaking and any research associated with it. NRC licensees would benefit from the elimination of the need for exemption requests. The NRC would benefit from not having to review and approve such requests. The recommended changes under Option 2 would promote regulatory certainty, as well as openness and transparency of regulatory decisions with licensees of reactors in decommissioning that choose to reduce onsite and offsite financial protection amounts. These changes would have no adverse impact on public health, safety, or security.

7.3 Option 3: Four-Step Graded Approach

7.3.1 Impact on Public Health, Safety, and Security

In Option 3, the NRC staff would undertake a rulemaking to provide a four-tiered approach to insurance requirements during decommissioning. The proposed four levels, and the basis for transitioning between those levels, are discussed in Section 4.3 of this appendix. Because the rulemaking under Option 3 would reduce the amounts of insurance licensees must have to the same amounts as in Option 2, the impacts of Option 3 for Level 1 and Level 2 would be equivalent to the impacts of Option 2. The rulemaking under Option 3 would also reduce the amounts of insurance licensees must have in Level 3 and Level 4 to amounts informed by the risk and consequences of an accident at each level, just as with Level 1 and Level 2. For these reasons, Option 3 would result in no adverse impacts on public health, safety, or security.

7.3.2 Impacts on NRC Licensees

Option 3 would result in time and monetary savings for licensees, which would otherwise need to seek a regulatory exemption to reduce offsite and onsite financial protection amounts while decommissioning. Changes to the regulations would eliminate the need for exemption requests for decommissioning reactors. Licensees would no longer be required to undergo the administrative and monetary burden associated with the regulatory exemption request process, and would realize more timely reductions in insurance premiums. Licensees may also be able to expedite the decommissioning process by eliminating any delays associated with processing exemptions. If the recommended technical basis is adopted for insurance purposes, licensees

would gain the added benefit of providing one (fuel) analysis to satisfy both EP and insurance reduction requirements.

7.3.3 Impacts on the NRC

Option 3 would result in an initial significant resource (time and money) investment followed by ongoing savings for the NRC. Initially, there would be incremental costs to the NRC to undertake the rulemaking process. These costs include the preparation of the proposed rule and supporting guidance development; specifically, NRC staff time to prepare proposed rule language, guidance, and supporting analyses and to conduct public outreach efforts. After publishing the proposed rule, the NRC would incur costs associated with public comment resolution and preparation of the final rule.

7.3.4 Additional Considerations

There are no additional considerations for this option.

7.3.5 Summary of Costs and Benefits

Under Option 3, the NRC would incur the short term cost of rulemaking and any associated research. NRC licensees would benefit from the elimination of the need for exemption requests. The NRC would benefit from not having to review and approve such requests. The recommended changes under Option 3 promote regulatory certainty, as well as openness and transparency with licensees of reactors in decommissioning that choose to reduce onsite and offsite financial protection amounts. These changes would have no adverse impact on public health, safety, or security.

8 BACKFITTING AND ISSUE FINALITY CONSIDERATIONS

Changes to the NRC regulations in 10 CFR Part 140 are not subject to the backfitting provisions in 10 CFR 50.109 or any of the issue finality provisions in 10 CFR Part 52 (together, the Backfit Rule). The PAA requires licensees to have offsite financial protection. Fundamentally, because 10 CFR Part 140 actions would not directly provide radiological public health and safety or common defense and security benefits, 10 CFR Part 140 does not involve actions within the purview of the Backfit Rule. Further, changes to 10 CFR Part 140 financial requirements would not meet the definition of "backfitting" in 10 CFR 50.109(a)(1) because they would not be a "modification of or addition to systems, structures, components, or design of a facility…or the procedures or organization required to design, construct or operate a facility…."
Similarly, the onsite insurance requirements in 10 CFR 50.54(w) do not fall within the purview of the Backfit Rule. In the backfitting discussion for the 1987 final rule, "Changes in Property Insurance Requirements for NRC Licensed Nuclear Power Plants" (52 FR 28963, 28972; August 5, 1987), the Commission stated the following:

> This final rule requiring an increase in property damage insurance does not require "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." Accordingly, this action is not a backfit as defined in § 50.109.

The Commission took similar positions on backfitting in subsequent rulemakings to amend 10 CFR 50.54(w) (e.g., 54 FR 11163, March 17, 1989; 55 FR 12163, April 2, 1990).

9 NRC OBSERVATIONS ON STAKEHOLDER FEEDBACK ON DRAFT REGULATORY BASIS

The NRC's Regulatory Improvements for Power Reactors Transitioning to Decommissioning Rulemaking has received numerous public comments in various forms. The NRC appreciates the interest generated by the rulemaking and is considering each public comment in its rulemaking efforts.

9.1 Feedback from Public Meetings

The NRC held a public meeting from May 8 to May 10, 2017, to present and discuss the draft regulatory basis for the NRC's rulemaking. Three questions asked during the meeting were related to financial protection. The NRC deemed two of those questions relevant and summarizes the questions and the NRC's responses below.

First, a member of the public asked if reactor licensees could rely on the $13 billion in financial protection provided by the PAA framework while in a decommissioning status. The NRC staff responded that a licensee in a decommissioning status could not rely on the $13 billion in financial protection provided by the PAA framework. Under the PAA and the NRC's implementing regulations, a licensee's offsite financial protection is currently limited to approximately $13 billion while in operation; this includes primary financial protection and the amount of aggregate financial protection received from an industry retrospective rating plan (or secondary insurance pool). During decommissioning, a licensee may request an exemption from the NRC's insurance regulations. The current exemption process allows for a one-time reduction in the required insurance amounts that corresponds with a decrease in the risk of a nuclear incident. If the NRC approves a licensee's exemption request, the licensee's insurance amount can be reduced to $100 million. At this point, once a licensee acts to withdraw from the industry retrospective rating plan, it would no longer have access to the Price-Anderson insurance amount of $13 billion. In addition to the $100 million in liability insurance, the licensee would become eligible for NRC indemnification in accordance with the terms of its indemnity agreement. If indemnity were to be required, the NRC would pay the lesser amount of either: a) $560 million minus the offsite liability insurance amount the NRC requires the licensee to have, or b) $500 million. For a licensee that has $100 million in insurance, therefore, the total indemnification would be $460 million. These amounts reflect the PAA's limit of public liability of $560 million and its limit of NRC indemnification of $500 million (which reduced for every dollar of insurance required above $60 million).

A second member of the public asked whether insurance premiums could be paid with decommissioning trust funds while a licensee is in a decommissioning status. The NRC staff responded that a licensee in a decommissioning status could pay its insurance premiums using its decommissioning trust funds.

9.2 Main Themes from Public Comment Submittals

The NRC solicited comments from the public on the draft regulatory basis for the NRC's rulemaking. The public provided numerous comments to Appendix G. Some comments were

addressed elsewhere in the regulatory basis or were out of scope. The NRC's consideration of the remaining comments is summarized below.

The public comments had the following main themes:

- timing of reduced insurance
- beyond-design-basis events
- decommissioning level
- ownership of spent nuclear fuel
- fuel heatup
- financial protection of ISFSI sites
- method to determine amount of financial protection
- amount of financial protection
- solvency

9.2.1 Timing of Reduced Insurance

Several commenters stated that offsite and onsite insurance should only be reduced once all fuel has been transferred to an ISFSI.

NRC Response

As concluded in COMSECY-13-0030, "Staff Evaluation and Recommendation for Japan Lessons-Learned Tier 3 Issue on Expedited Transfer of Spent Fuel," dated November 12, 2013 (ADAMS Accession No. ML13329A918), and the corresponding SRM, dated May 23, 2014 (ADAMS Accession No. ML14143A360), the Commission has determined that spent fuel can be stored safely in the SFP or in an ISFSI. Nevertheless, the NRC staff is currently considering whether the levels of insurance need to be adjusted.

9.2.2 The Basis for the Transition between Levels 1 and 2

One comment referred to the technical basis provided in the Commission paper series and asks why a reduction in insurance would be allowed if a "beyond design" event is found to be "reasonably conceivable."

NRC Response

The NRC staff disagrees with the comment's inference that a reduction of insurance is allowed while the "beyond design" event is found to be "reasonably conceivable." The NRC staff notes that the reference is describing a scenario where the spent fuel is initially removed from the reactor. This scenario is equivalent to the scenario described in Level 1 of this appendix. Under this scenario, the spent fuel has not cooled to a point where a zirconium fuel cladding fire can be excluded in the event of the complete loss of water in the SFP. The NRC staff notes that a reduction of insurance would actually not occur at this point but only when the fuel has cooled to the point that it cannot heat up to clad ignition temperature within 10 hours under adiabatic conditions. Maintaining this level of insurance recognizes the potential for insurance claims following an accident in the spent fuel pool, even though the event is unlikely.

9.2.3 Decommissioning Level

Several comments related to the decommissioning level and corresponding insurance requirements. One commenter asked why a licensee at Level 4 is required to maintain insurance. Another commenter recommended that the NRC provide more descriptive explanations to the four decommissioning levels considered in the rulemaking. An additional commenter stated that the NRC staff proposed "Option 3: Four-Step Graded Approach" as its recommended option under this rulemaking.

NRC Response

The NRC staff notes that the PAA requires licensees to maintain some level of offsite insurance until the license is terminated. The NRC is currently evaluating the limits of all required offsite and onsite insurance in this regard. The NRC staff believes that the levels are adequately described in the tables in Options 2 and 3 and the subsequent discussions. The NRC staff notes that more specific recommendations on how to provide "more complete descriptions" are welcomed.

The NRC staff recommends "Option 2: Two-Step Graded Approach." The NRC staff first mentioned the need to fully examine Option 3 in the draft regulatory basis. The NRC staff notes that SECY-96-256 proposed the four-step graded approach to open a conversation with the industry and did not set a qualified standard for the amounts of proposed financial protection or the levels of decommissioning reactors. The NRC staff has not fully vetted this approach in its current form and thus could not recommend its use at the regulatory basis stage, but will continue to explore this approach. The NRC staff appreciates the analysis provided for a "six-step graded approach" as it demonstrates an appreciation for the complexity of decommissioning and the establishment of the bases required for each step. The NRC staff will consider this analysis as it examines the bases required for each level, should it pursue this option.

9.2.4 Ownership of Spent Nuclear Fuel

A commenter supported the NRC staff's consideration for the eventual transportation of spent fuel to the DOE. The commenter recommended that the NRC consider the availability of funds for States that are stewards of the spent nuclear fuel.

NRC Response

This comment's recommendation is beyond the scope of this appendix.

9.2.5 Fuel Heatup

A commenter noted that an inconsistency related to the bases of fuel heatup exists. Specifically, the commenter noted that Appendix G to this draft regulatory basis references a cladding temperature of 565 degrees C, while Appendix A references a 10-hour heatup of 900 degrees C.

NRC Response

The NRC staff notes that Appendix G and Appendix A currently employ two different technical bases that are used for the relaxation of insurance and EP requirements, respectively. Although

they are similar in nature, the basis originally referenced in Appendix G did not consider a 10-hour heatup time. The NRC staff is examining the possibility of adopting the technical standard used in Appendix A.

9.2.6 Financial Protection of ISFSI Sites

Several commenters asked that the NRC recognize the difference between "ISFSI-Only Sites," and "Standalone ISFSIs."[19]. Another commenter expressed opposition to any involuntary imposition of financial protection requirements on specifically licensed 10 CFR Part 72 ISFSIs. The commenter stated that the NRC has not cited any technical, legal, or regulatory basis to impose any such requirements. The commenter further states that 10 CFR Part 72 licensees are not included in the class of licensees required to have offsite protection under the PAA, and thus, there is no statutory basis on which to impose financial protection requirements.

NRC Response

The NRC staff is aware of the regulatory disparity between 10 CFR Part 50 and 10 CFR Part 72. As noted in Section 6.2, under "Independent Spent Fuel Storage Installations," the NRC staff is currently considering the disparity between each licensed facility as part of this rulemaking. The NRC staff recognizes that 10 CFR Part 72 ISFSIs are not required to have the same amounts of financial protection that would be required for an ISFSI that originated from a 10 CFR Part 50 license. The NRC staff also recognizes that an actual offsite release for Part 72 ISFSIs is not required to trigger an evacuation event, as was the case with TMI-2. Section 6.2, under "Independent Spent Fuel Storage Installations," provides the NRC staff's reasoning underlying the proposal to consider insurance requirements for 10 CFR Part 72 ISFSIs.

With respect to specifically licensed ISFSIs, the NRC staff points to the Commission paper series, which has called into question the status of the 10 CFR Part 72 licensees' financial protection status. On multiple occasions, the Commission tasked the NRC staff with identifying an appropriate methodology for assessing financial risk that could be applied to the storage of spent fuel in either an SFP or an ISFSI. Under the terms of the PAA, the NRC reserves the right to determine financial protection requirements for any of its licensees. As noted above, the NRC staff recognizes that the agency may have previously reviewed the applicability of financial protection requirements for 10 CFR Part 72 licensees and will take this into consideration while determining whether adjustments are necessary.

9.2.7 Method To Determine Amount of Financial Protection Required

One commenter supported the NRC staff's assessment of the need to develop a quantitative methodology to better determine the amounts of financial protection required for decommissioning reactors. The commenter proposed consideration of inflation, risk level, and new knowledge based on the Fukushima incident. Another commenter reasoned that the NRC's financial protection figures do not adequately account for broader economic, environmental, and social impacts, and that the real-world example of Fukushima should be considered, since the early reduction of safety systems based on incorrect assessments and hypotheses endangers the public and the environment. A third commenter recommended that the offsite financial protection should increase the $100 million number to reflect three developments since the 1990s: (1) inflation, (2) potential increased costs from the use of

[19] The terms "ISFSI-only" sites and "standalone ISFSI" sites are discussed in section 3.2 of the main regulatory basis.

high-burnup fuel, and (3) the enormous real-world offsite costs resulting from more recent radiological incidents such as Fukushima. A fourth commenter noted that, because the proposed amounts of financial protection are already conservative, there is no compelling basis to adjust for inflation at this time.

NRC Response

The NRC staff continues to assess the financial protection requirements and available options to adjust them in the rulemaking. Specific applicability of factors such as those recommended by the first commenter are not easily determined. As discussed in Section 3.2, the NRC has previously solicited industry participation to determine the appropriate amounts of insurance for decommissioning reactors.

The NRC staff notes that the PAA is available to satisfy pubic liability claims and does not explicitly consider "broader economic, environmental, and social impacts." However, in recognition of concerns about the adequacy of the limit of liability, the 1975 amendments explicitly provided that "in the event of a nuclear incident involving damages in excess of [the] amount of aggregate liability, the Congress will thoroughly review the particular incident and will take whatever action is deemed necessary and appropriate to protect the public from the consequences of a disaster of such magnitude." Thus, Congress reserves the right to review the events surrounding any nuclear event requiring additional funding beyond what is already available.

The NRC staff recognizes the potential need for adjustments to financial protection amounts and is currently exploring its available options to address this policy implication under the rulemaking in an attempt to appropriately quantify the economic consequences of an incident at a decommissioned site in consideration of the events at Fukushima and previously published literature.

The NRC staff disagrees with the comment that the amount of financial protection is conclusively conservative. These numbers were intended to serve as a temporary basis and were only determined through qualitative analysis, but that is not, in and of itself, a basis for asserting that it is conclusively conservative.

9.2.8 Amount of Financial Protection

One commenter proposed a Level 4 financial protection amount of $1 million since offsite consequences are negligible.

NRC Response

As discussed in Section 4.3, the NRC staff notes that an actual offsite consequence is not required to trigger an evacuation. The NRC staff points to the TMI-2 experience, where offsite consequences were also negligible. In total, TMI-2 required $71 million in PAA funding. Thus, consideration of whether or not an actual release of radioactive material occurs may not be a suitable basis for lowering required financial protection amounts to $1 million. That being said, the NRC staff is considering the available options under this rulemaking, and will consider the industry's opinion that a minimal amount of financial protection is required in Level 4.

9.2.9 Solvency

One commenter questioned the solvency of a merchant plant.

NRC Response

The NRC's financial protection regulations do not distinguish between regulated and unregulated operating reactors. However, the NRC staff is currently examining the available options under the rulemaking and is considering the applicability of its financial protection regulations towards a merchant plant.

10 NRC RECOMMENDATION

Options 1 and 3 provide some level of uncertainty. Therefore, the NRC staff recommends Option 2, "Two-Step Graded Approach," since it currently provides the greatest regulatory certainty. Option 1 would not provide any change to the current process and would, therefore, negate the spirit of the rulemaking effort in that it would continue to require licensees to submit regulatory exemptions. Option 3 would codify a process that is forward-looking for a licensee in decommissioning and also meets the intent of the regulations. However, the NRC staff is examining the postulated events and amounts of financial protection in Option 3 to determine their sufficiency for implementation.

APPENDIX H
CURRENT REGULATORY APPROACH TO DECOMMISSIONING

CONTENTS

1 INTRODUCTION

1.1 Current Regulatory Framework for the Decommissioning Process

After a licensee permanently shuts down a power reactor facility and enters decommissioning, the licensee goes through a transition period to reconfigure the licensing basis and operational approach to reflect the differences between an operating power reactor facility and a power reactor facility in decommissioning. The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.82, "Termination of license," govern decommissioning. These regulations establish a timeframe for completion of decommissioning, determine which types of activities require prior approval before being implemented, govern the release criteria the site must meet to qualify for license termination, outline the appropriate use of decommissioning funds, and set up the enveloping environmental considerations for decommissioning, among other items. The U.S. Nuclear Regulatory Commission (NRC) updated these regulations in 1996 (Volume 61 of the *Federal Register* (FR), page 39278 (61 FR 39278); July 29, 1996) to include enhancements and lessons learned from earlier decommissioning activities; additional revisions to the decommissioning regulations were made in 1997 (62 FR 39091), 2003 (68 FR 19727), 2011 (76 FR 35571), and 2014 (79 FR 66603).

The 1996 rulemaking changed 10 CFR 50.82 to provide licensees with simplicity and flexibility in implementing the decommissioning process.[20] The changes removed the requirement that the NRC approve decommissioning activities before a licensee initiates the decommissioning process. The changes were also intended to clarify ambiguities in the previous decommissioning regulations, codify procedures and terminology that had been used in a number of specific cases, and increase opportunities for the public to learn about licensees' decommissioning activities. The changes were also designed to establish a level of NRC oversight commensurate with the level of safety concerns expected during decommissioning activities. The resulting regulations form the current reactor decommissioning process.

In addition, the 1996 rulemaking recognized States' responsibilities and authority within the decommissioning process. While not specifically addressed, the rulemaking took into account the role of States to provide licensees with the means to collect revenues for decommissioning, typically through State Public Utility Commissions, to ensure that adequate funding would be available to complete decommissioning as required by the NRC, as well as to address any additional requirements, such as site restoration, that may be established by States. In some cases, States have site cleanup standards as part of the state permitting process that are in addition to the NRC's nuclear safety requirements. For example, the States of Maine and Connecticut required lower residual radioactivity criteria for unrestricted site release than the NRC did, and mandated prompt decommissioning of the Maine Yankee and Haddam Neck (Connecticut Yankee) sites. Since the States mandated these additional requirements, the States provided the financial means (through funds approved and appropriated by the associated Public Utility Commission) for the licensees to comply with them.

[20] The requirements in 10 CFR 50.82 are mirrored in 10 CFR 52.110, "Termination of license," for holders of combined licenses issued under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants"; therefore, changes to the regulatory requirements in 10 CFR 50.82 would also need to be made in 10 CFR 52.110.

1.2 Establishment of an Updated Decommissioning Regulatory Framework

As previously discussed in this regulatory basis, in the staff requirements memorandum dated December 30, 2014, for SECY-14-0118, "Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements," dated October 29, 2014, the Commission directed the staff to pursue rulemaking to address the issues discussed in SECY-00-0145, such as the graded approach to emergency preparedness; lessons learned from the plants that have already (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.

With regard to this appendix, the NRC staff considered four general areas where decommissioning experience could inform the development of a regulatory basis for a power reactor decommissioning rulemaking:

1. The NRC staff evaluated the regulations in 10 CFR 50.82(a)(4) and 10 CFR 50.82(a)(5) to determine whether the NRC should explicitly approve each licensee's PSDAR before allowing major decommissioning activities to begin.

2. The NRC staff reviewed the options for decommissioning described in NUREG-0586, Supplement 1, Volume 1, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," issued November 2002 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML023470304), also called the Decommissioning Generic Environmental Impact Statement (GEIS), to determine the appropriateness of maintaining the three options for decommissioning.

3. The NRC staff evaluated whether the timeframe of 60 years to complete decommissioning, currently required by 10 CFR 50.82(a)(3), remains appropriate.

4. The NRC staff examined the role of State and local governments and non-governmental stakeholders in the decommissioning process.

In addition, the staff conducted an overall review of the decommissioning regulations to identify areas where the regulatory process could be improved in terms of efficiency, clarity, and other enhancements. This review identified five areas where additional rule changes would benefit the decommissioning process:

1. Amend 10 CFR 50.82(a) to clarify that licensees must evaluate the environmental impacts of decommissioning, and whether they are bounded, in the PSDAR.

2. Amend 10 CFR 50.59(d)(3); 10 CFR 50.71(c); General Design Criterion 1, "Quality Standards and Records," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"; Criterion XVII, "Quality Assurance Records," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50; and 10 CFR 72.72(d) to remove certain record-retention requirements for structures, systems, and components (SSCs) that no longer remain in service during decommissioning, as well as duplication requirements for spent fuel storage records.

3. Amend 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, for investigating shipments of low-level radioactive wastes if the shipper has not received notification of receipt within 20 days after transfer, to allow a 45-day notification window based on operating experience that shows that this is a reasonable delay for LLW shipments.

4. Require that the decommissioning documents described in 10 CFR 50.54(bb), 10 CFR 50.82, 10 CFR 52.110, “Termination of license,” or a combination thereof, contain information on spent fuel management planning, in accordance with the regulatory requirements in 10 CFR 72.218, “Termination of licenses.”

5. Amend 10 CFR 51.53, “Postconstruction environmental reports,” and 10 CFR 51.95, “Postconstruction environmental impact statements,” to clarify the environmental reporting requirements and add a reference to 10 CFR 52.110.

As discussed throughout this appendix, in general, while the NRC staff has concluded that it does not have a basis to significantly change the current decommissioning process or associated policies, it can incorporate improvements where appropriate to enhance transparency and improve regulatory efficiency. These improvements primarily involve (1) providing updated and more detailed guidance to licensees regarding the content of the decommissioning documents to enhance the information provided during the decommissioning process, (2) implementing rulemaking changes for specific issues to reduce regulatory burden based on the decreased risk at the decommissioning plant or clarify existing regulations, and (3) updating the associated guidance to reflect these rule changes and provide licensees with additional guidance for implementing the clarified regulations.

1.3 Technical Considerations for the Decommissioning Rulemaking

In conducting its Commission-directed evaluation of the reactor decommissioning process, the NRC staff used precedent from earlier decommissioning rulemakings, the statements of consideration (SOCs) for those rules, and the technical basis documents (such as NUREGs, regulatory guides (RGs), and Commission papers) that supported the final rules, as well as general lessons learned from previous decommissioning activities that remain applicable today.

The NRC staff also reviewed:

- industry and NRC reports created to document the decommissioning process at several power reactors that have had their licenses terminated under the pre-1996 decommissioning regulations (e.g., Yankee Rowe and Trojan);

- a series of technical reports created by the Electric Power Research Institute (EPRI) to discuss decommissioning experiences and lessons learned;

- the decommissioning information and licensing documents generated to support facilities that have achieved or are nearing license termination under the current regulations (e.g., Humboldt Bay and Big Rock Point);

- the existing NUREGs and other technical documents that form the basis for the current decommissioning process and its timeline;

- lessons learned from the plants that recently entered decommissioning (Kewaunee Power Station (Kewaunee), Crystal River Unit 3 Nuclear Generating Plant (Crystal River Unit 3), San Onofre Nuclear Generating Station (SONGS), Units 2 and 3, and Vermont Yankee Nuclear Power Station (VY)); and

- the public comments received on the advance notice of proposed rulemaking (ANPR) and draft regulatory basis produced for this rulemaking activity.

The NRC staff examined these documents to determine which technical and regulatory bases and conclusions are still applicable, which may need to be updated, and which could be improved given the lessons learned since the last update of the decommissioning regulations.

1.4 Potential Impacts of the Decommissioning Rulemaking

Depending on the changes made to the long-term decommissioning requirements, significantly changing the current decommissioning process could result in substantial impacts on licensees, stakeholders, and the NRC. For example, because the current regulations drive and establish decommissioning planning activities, including the decommissioning trust fund levels, drastic changes in the timeframe or options for decommissioning could have a significant impact on the ability of licensees nearing the end of plant life to adequately prepare for decommissioning activities. There could also be an impact if the decision of the 1996 decommissioning rulemaking is reversed, such that NRC approval of a decommissioning planning document is once again made a requirement. Specifically, requiring NRC approval of the PSDAR would increase the regulatory level of effort necessary for both licensees and the NRC staff without a commensurate gain to public health and safety, as already outlined in the 1996 rulemaking SOC. Additionally, NRC approval of the PSDAR would be an NRC licensing action and would require the NRC to conduct a review in accordance with the National Environmental Policy Act (NEPA) and related environmental statutes. The NRC staff discusses the specific benefits and costs in more detail for each area being considered in this appendix, as well as in the associated regulatory analysis document.

1.5 Summary of Justification for Recommended Changes

The NRC staff evaluated the decommissioning regulations based on the Commission's direction in the staff requirements memorandum for SECY-14-0118. For the reasons discussed in this appendix, the NRC staff concludes that clarifications or enhancements to the overall decommissioning process, through updates to the associated guidance documents, would add clarity or efficiency to the decommissioning framework. In addition, as noted in Section 1.2, the NRC staff recommends five regulation changes to clarify current requirements and enhance efficiency. By making the changes identified during the review of the overall decommissioning process, the NRC staff would update or clarify the decommissioning guidance and requirements 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. Public comments received on the draft regulatory basis helped to inform the staff's recommendations. This appendix documents the staff's recommendations, along with a full assessment of the rulemaking options.

2 LEVEL OF PSDAR REVIEW BY THE NRC

2.1 Existing Regulatory Framework

2.1.1 Establishment of the PSDAR for the Decommissioning Process

In accordance with 10 CFR 50.2, "Definitions," "decommission" means 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. Before the 1996 rulemaking, the reactor decommissioning regulations required a licensee to submit a detailed decommissioning plan (DP) and have it approved by the NRC before the licensee could begin dismantlement or any major decommissioning activities. One of the drivers behind the 1996 rulemaking was a recognition of the reduction in the risks to public health and safety at a permanently shutdown power reactor with the fuel removed from the reactor vessel as compared to an operating power reactor, as discussed further in Section 2.1 of the main regulatory basis document. Thus, the 1996 rulemaking changed the decommissioning regulations to reflect this reduced risk at nuclear power reactors. The purpose of this change was to "reduce the regulatory burden, provide greater flexibility, and…enhance efficiency and uniformity in the regulatory process of decommissioning nuclear power plants" (61 FR 39278).

One of the primary means of achieving these goals, for power reactors, was to replace the DP with the PSDAR, which the NRC would review but not approve. In the associated SOC, the Commission explained the basis for this change (61 FR 39279):

> [T]he activities performed by the licensee during decommissioning do not have a significant potential to impact public health and safety and these require considerably less oversight by the NRC than during power operations.

The Commission also allowed decommissioning activities to be conducted under 10 CFR 50.59, "Changes, tests and experiments," without prior NRC approval (61 FR 39279):

> Based on NRC experience with licensee decommissioning activities, the Commission recognized that the 10 CFR 50.59 process used by the licensee during reactor operations encompassed routine activities that are similar to those undertaken during the decommissioning process. The Commission concluded that the 10 CFR 50.59 process could be used by the licensee to perform major decommissioning activities if licensing conditions and the level of NRC oversight required during reactor operations are continued, commensurate with the status of the facility being decommissioned.

The current regulation in 10 CFR 50.82(a)(4)(i) requires that, before or within 2 years following permanent cessation of operations, the licensee must submit a PSDAR to the NRC and a copy to the affected States. The PSDAR must contain a description of the planned decommissioning activities, a schedule for their accomplishment, the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate previously issued environmental impact statements (EISs), and a site-specific decommissioning cost estimate (DCE), including the projected cost of managing irradiated fuel (e.g., at an onsite independent spent fuel storage installation (ISFSI)).

The PSDAR serves several purposes in planning for decommissioning:

- informing the public of the licensee's planned decommissioning activities;
- assisting in the scheduling of NRC resources necessary for the appropriate technical review and inspection oversight activities;
- ensuring that the licensee has considered the costs of the planned decommissioning activities and provided an estimate of those costs; and
- ensuring that the environmental impacts of the planned decommissioning activities are bounded by those considered in existing EISs.

Because the 1996 rulemaking removed the requirement for NRC approval of a DP prior to the commencement of major decommissioning activities, a power reactor facility's transition from operating to decommissioning no longer involved an agency action that would trigger NRC responsibilities under environmental statutes, such as the NEPA, the Endangered Species Act (ESA), and the National Historic Preservation Act (NHPA). At the time of the rulemaking, the NRC concluded that the environmental impacts associated with power reactor decommissioning activities are expected to be minor and should be bounded by previous environmental analyses, such as those in the final environmental statements[21] prepared to support operation and the Decommissioning GEIS (61 FR 39283). The NRC therefore issued a finding of no significant impact for the rulemaking (61 FR 39296).

The 1996 rulemaking required, in 10 CFR 50.82(a)(4)(i), that PSDARs provide the reasons for concluding that appropriate previously issued EISs will bound the environmental impacts associated with site-specific decommissioning activities. Further, 10 CFR 50.82(a)(6)(ii) states that licensees shall not perform any decommissioning activities that result in significant environmental impacts not previously reviewed. The 1996 SOC explained that this would account for site-specific situations that may occur during decommissioning that are outside the previously considered environmental impacts. If a licensee wanted to pursue a decommissioning activity that would result in significant environmental impacts not previously reviewed, then the licensee would need to obtain a license amendment (which would include an environmental analysis) or an exemption from the requirements in 10 CFR 50.82(a)(6)(ii) (61 FR 39283), the application for which would trigger NRC responsibilities under the environmental statutes (because there would then be an agency action).

After the NRC receives a PSDAR, 10 CFR 50.82(a)(4)(ii) requires that the NRC publish a notice of receipt in the *Federal Register*, make the PSDAR available for public review and comment, and hold a public meeting in the vicinity of the facility to discuss the licensee's plans for decontamination and dismantlement of the facility, as well as the decommissioning timeframe. The standard practice of the NRC staff when reviewing the PSDAR has been to provide an acknowledgment letter to the licensee that summarizes the staff's understanding of the PSDAR, provides highlights from the PSDAR public meeting, and categorizes the stakeholder comments received on the PSDAR. Preparation of such a letter, while not required, is being incorporated as a lesson learned from the recently shutdown reactors, which will be followed for facilities entering decommissioning in the future.

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[21] The "final environmental statement" is the equivalent of a "final environmental impact statement," as this type of document is presently known.

Although the NRC will assess the PSDAR to determine whether the information is consistent with the requirements in the decommissioning regulations, NRC approval of the PSDAR is not required. However, should the NRC determine that the PSDAR does not satisfy the information requirements of 10 CFR 50.82(a)(4), the NRC would inform the licensee, in writing, of the deficiencies before major decommissioning activities begin. The NRC conveys any deficiencies to the licensee in a request for additional information (RAI), to which the licensee will respond to satisfy the information requirements in 10 CFR 50.82(a)(4) before major decommissioning activities can begin. The NRC reviews the response to the RAIs to ensure that the updated information meets the regulatory requirements for PSDAR content. As necessary, the NRC will raise any further deficiencies with the licensee in subsequent interactions, including additional letters, public meetings, or onsite inspections.

In accordance with 10 CFR 50.82(a)(6), the licensee shall not perform any decommissioning activities that could foreclose release of the site for possible unrestricted use, result in there no longer being reasonable assurance that adequate funds will be available for decommissioning, or result in significant environmental impacts not previously reviewed. The 1996 rulemaking SOC states that if a licensee contemplates decommissioning activities that would violate these requirements, then the licensee may not use the 10 CFR 50.59 process to perform the activities (61 FR 39283). Rather, to avoid violating 10 CFR 50.82(a)(6), the licensee would be required to submit for prior NRC approval a license amendment request (LAR) to perform the activities, which would trigger an opportunity for stakeholders to comment and request a public hearing in accordance with 10 CFR 50.91, "Notice for public comment; State consultation." Further, the NRC's prospective approval of the LAR would constitute an agency action, and thus trigger NRC responsibilities under NEPA, the NHPA, and the ESA. Similarly, the licensee could request an exemption from 10 CFR 50.82(a)(6)(ii). The NRC's approval of an exemption request would be an agency action requiring a NEPA analysis and potential consultations under Section 106 of the NHPA and Section 7 of the ESA. Unless the NRC approves the license amendment or exemption request, the licensee may not conduct the requested decommissioning activity without risking the NRC taking an enforcement action.

2.1.2 Use of the License Termination Plan in the Decommissioning Process

In addition, the 1996 rulemaking required that, to terminate its license, a power reactor licensee must submit an application for termination of the license, which would be accompanied or preceded by a license termination plan (LTP) that must be submitted at least 2 years before the termination of license date. The LTP and its associated license amendment request require NRC approval. Under 10 CFR 50.82(a)(9)(ii), the LTP must include the following:

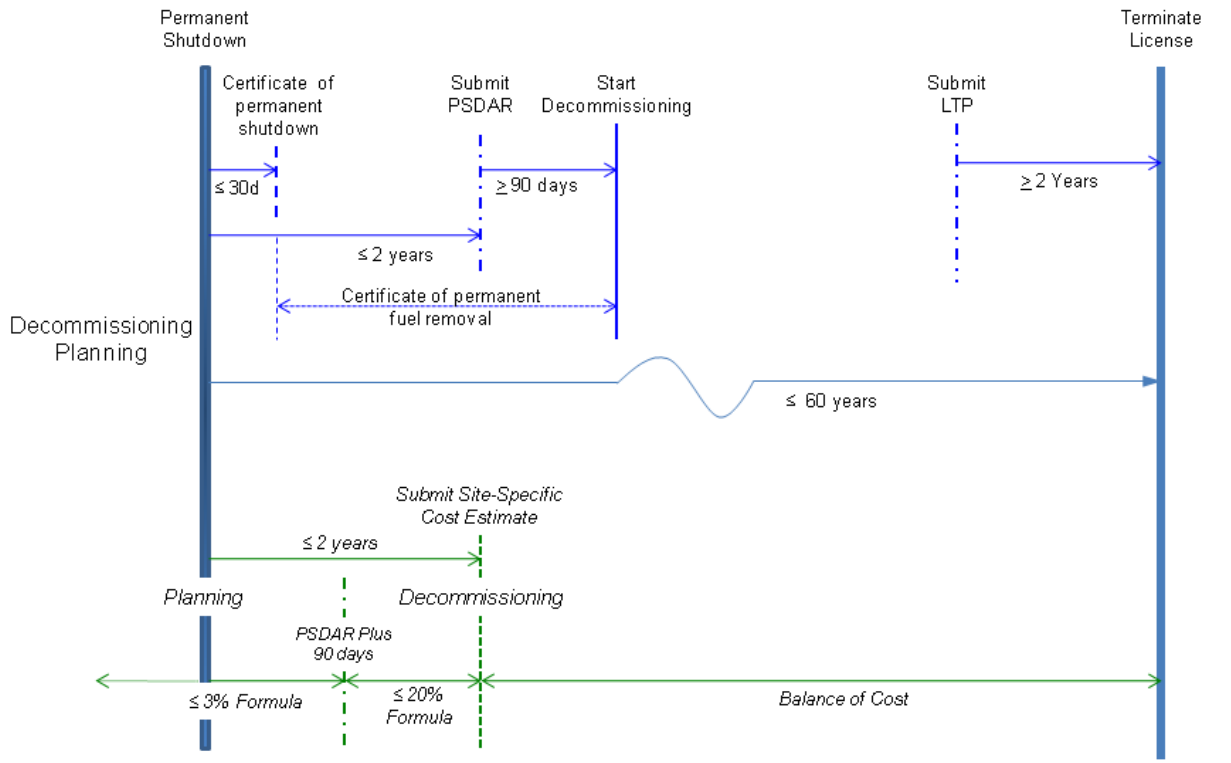
- a site characterization;
- identification of remaining dismantlement activities;
- plans for site remediation;
- detailed plans for the final radiation survey;
- a description of the end use of the site, if restricted;
- an updated site-specific estimate of remaining decommissioning costs;

- a supplement to the environmental report, pursuant to 10 CFR 51.53, describing any new information or significant environmental change associated with the licensee's proposed termination activities; and

- identification of parts, if any, of the facility or site that were released for use under 10 CFR 50.83, "Release of part of a power reactor facility or site for unrestricted use," before approval of the LTP.

The regulation in 10 CFR 50.82(a)(9)(iii) requires that, after receiving an LTP, the NRC must publish a notice of receipt, make the LTP available for public review and comment, and hold a public meeting in the vicinity of the facility to discuss the licensee's plans for completing the remediation of residual radioactivity at the site and terminating the license. Pursuant to 10 CFR 50.82(a)(10), the NRC then conducts a detailed technical and regulatory review to ensure that the LTP demonstrates: (1) the adequacy of the licensee's decommissioning funding plan to assure that sufficient funding is available to complete the remaining radiological remediation activities; (2) the appropriate radiation-release criteria for license termination (in accordance with 10 CFR Part 20, Subpart E, "Radiological Criteria for License Termination"); and (3) the adequacy of the design of the final radiation survey to verify that the release criteria have been met. In addition, if the LTP demonstrates that the remainder of the decommissioning activities will be performed in accordance with the Commission's regulations, will not be inimical to the common defense and security or to the public health and safety, and will not have a significant effect on the quality of the environment, then the NRC shall approve the LTP by license amendment. The NRC staff also currently prepares an environmental assessment (EA) to support its determination. However, the NRC is evaluating the possibility of rulemaking to consider using categorical exclusions for the LTP environmental reviews.

SIMPLE DECOMMISSIONING TIMELINE



Upon submission of the final radiation survey by the licensee, the NRC conducts a confirmatory survey to determine whether the final radiation survey and associated documents demonstrate that the licensee has satisfied the radiological release criteria of 10 CFR Part 20, Subpart E. Together, the PSDAR, the NRC's oversight of decommissioning activities, the LTP, the NRC's approval of the LTP, and the NRC's verification that the site's remaining residual radioactivity meets the site release criteria, form the current framework for power reactors undergoing decommissioning and license termination.

2.2 Regulatory and Rulemaking Options

The NRC staff examined whether the regulatory or technical bases related to the NRC's current level of review of the PSDAR have changed since the 1996 decommissioning rule. The staff also explored opportunities to clarify and incorporate enhancements or improvements to the regulatory framework based on lessons learned since promulgation of the rule. The staff considered and evaluated four options: (1) no action, (2) guidance development or enhancement, (3) rulemaking for specific issues, and (4) rulemaking to require PSDAR approval by the NRC. A description and the NRC staff's assessment of each option follow.

2.2.1 Option 1—No Action

2.2.1.1 Description of Option 1

The no-action option would retain the current decommissioning regulations regarding PSDARs, without any update to the associated regulatory guidance.

2.2.1.2 Assessment of Option 1

In determining whether the current decommissioning regulations and guidance regarding PSDARs remain sufficient to address ongoing and future decommissioning activities, the NRC staff evaluated the technical and regulatory bases associated with the 1988 (53 FR 24018; June 27, 1988) and the 1996 decommissioning rules, as well as the associated SOCs and public comments, and comments received to date on the ANPR and draft regulatory basis published for this rulemaking activity. Based on this review, the staff concluded that the use of the current PSDAR process meets the efficiency goal of the 1996 rulemaking and provides flexibility and simplicity in implementing the decommissioning process, while maintaining a level of NRC oversight and involvement commensurate with the level of safety concerns expected during decommissioning activities.

A review of lessons learned from power reactors that have performed decommissioning activities under a PSDAR rather than a DP also demonstrated that the use of a PSDAR that is not approved by the NRC did not in any way diminish the planning, preparation, and oversight conducted by the licensee or the NRC during decommissioning activities. Specifically, the NRC noted that the many interactions between the decommissioning licensees and the NRC staff during the decommissioning process, as well as the frequent inspection activities conducted under Inspection Manual Chapter (IMC) 2561, "Decommissioning Power Reactor Inspection Program," dated April 14, 2003 (ADAMS Accession No. ML031270502), ensure that the NRC maintains an appropriate level of oversight and engagement throughout the process. In addition, although the LTP is provided later in the decommissioning timeline than the DP was, the LTP provides sufficient detail to allow the NRC to make an adequate determination regarding residual radioactivity remaining onsite and whether the licensee's remediation

activities and plans for site remediation will allow for the release of the site in accordance with 10 CFR Part 20, Subpart E at the time of license termination.

The information requirements of the PSDAR, set forth in 10 CFR 50.82(a)(4)(i), mean that the licensee must provide an adequate discussion that provides the reasons for the licensee's conclusion that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate, previously issued environmental impact statements. Similarly, once the licensee begins major decommissioning actions, in accordance with the 10 CFR 50.82(a)(5) criteria, the licensee is subject to the 10 CFR 50.82(a)(6)(ii) prohibition.

Licensees in decommissioning would continue to be required to conclude in the PSDAR that the analyses in previous EISs will bound all site-specific environmental impacts from decommissioning activities. After the PSDAR is submitted, the licensees must remain in compliance with 10 CFR 50.82(a)(6)(ii). The NRC will monitor such compliance through routine oversight and inspection activities. The licensee can perform decommissioning activities without prior NRC approval, and any resultant NRC environmental evaluation, if the licensee satisfies the criteria of the 10 CFR 50.59 change process and does not violate 10 CFR 50.82(a)(6)(ii) (i.e., prohibition on decommissioning activities, as defined in 10 CFR 50.2, that result in significant environmental impacts not previously reviewed).

If the licensee is unable to comply with the requirements of 10 CFR 50.82(a)(4)(i) or 10 CFR 50.82(a)(6)(ii), several outcomes are possible:

- the licensee may submit a license amendment request for prior NRC approval of the decommissioning activity to address those impacts not previously reviewed (10 CFR 50.82(a)(6)(ii));

- the licensee may submit an exemption request to request that 10 CFR 50.82(a)(6)(ii) not apply in certain circumstances;

- the NRC may find the licensee to be in noncompliance with the regulations if the licensee takes an action that violates the 10 CFR 50.82(a)(6) prohibition; or

- the licensee may change its plans to avoid the decommissioning activities that would likely result in a significant environmental impact not previously reviewed.

If a licensee chooses to submit a license amendment or exemption request, the NRC would prepare an EA, or other appropriate NEPA document, as part of its licensing review and would complete any necessary environmental consultations, thus resolving any issues regarding unbounded environmental impacts.

2.2.2 Option 2—Guidance Development or Enhancement

2.2.2.1 Description of Option 2

As part of the power reactor decommissioning rulemaking, the NRC will update several of its guidance documents related to the decommissioning process. In these updates, the NRC could clarify subjects for which the NRC staff has previously needed to engage with licensees to obtain a more complete understanding as part of the agency's ongoing oversight of the decommissioning process. The NRC could also address concerns identified by stakeholders on

the level of detail and the review process for the PSDAR, without the need for formal rulemaking. Specifically, several of the comments received on the ANPR and draft regulatory basis published for this rulemaking activity focused on the level of detail in PSDARs submitted within the past several years. The NRC would update RG 1.185, Revision 1, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report," issued June 2013 (ADAMS Accession No. ML13140A038), to provide guidance on an acceptable level of detail on topics already required to be included in the PSDAR to inform the NRC staff, the public, and other stakeholders more fully about the licensees' decommissioning processes. As part of the rulemaking process, the NRC would publish this updated guidance as draft RG 1.185, Revision 2, for public review and comment before finalizing and issuing the document.

To inform the NRC staff, the public, and other stakeholders more fully, the guidance related to PSDARs could be revised to specify that the following additional information, related to topics that are already required to be included, should be provided:

1. Site modifications planned for the first 5 years after entering decommissioning, including any plans for construction and operation of an ISFSI, as well as the associated schedules and timelines for such activities.

2. The reasons for selecting a particular decommissioning strategy and timeline.

3. The long-term spent fuel management plans at the site, including a discussion of contingencies for addressing the potential need to replace casks or other spent fuel storage components at some point before the end of ISFSI operations, if applicable. This information may be more appropriately included in the irradiated fuel management plan (IFMP) pending the changes discussed in Section 8 of this appendix regarding spent fuel management planning requirements.

4. If available, site characterization information and potential dismantlement, decontamination, and remediation activities that will be undertaken, including a discussion of the results of any preliminary surveys or other environmental characterization activities done before the submission of the PSDAR, as well as a proposed plan for final site status and uses (e.g., industrial use, "green field").

5. If applicable, the licensee's plans for Tribal, State, and local government and community involvement in the decommissioning process. This involvement might take the form of an advisory panel, community outreach committee, or similar group constituted from the stakeholders most affected by the decommissioning activities at the facility. The PSDAR could include a discussion of how this group, if the licensee intends to create one, would participate throughout the decommissioning process.

6. The licensee's evaluation of the environmental impacts of the site-specific decommissioning activities (e.g., remediation activities, removal of large components) and planned site modifications. Currently, RG 1.185, Revision 1, states that (1) licensees should compare the potential environmental impacts associated with decommissioning to similar impacts given in the final environmental statement for the plant (as supplemented), the Decommissioning GEIS, and site-specific environmental assessments, (2) the comparison to impacts in the GEIS should recognize the unique nature of the site, and (3) licensees should focus on those resources not covered by previous site-specific NEPA analyses. The NRC could update the guidance documents to include more detail on how to evaluate the environmental impacts that require

site-specific analysis or that involve other Federal statutes such as the ESA and the NHPA, as well as to recommend that the licensee provide a summary of its analysis and its results in the PSDAR.

The updated guidance documents could also 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.

The NRC could also update RG 1.185 to reflect what licensees can do if they are unable to make the determination, as required by 10 CFR 50.82(a)(4)(i), that previous EISs bound the environmental impacts associated with a planned site-specific decommissioning activity, or determine that a decommissioning activity will result in significant environmental impacts not previously reviewed, as precluded by 10 CFR 50.82(a)(6)(ii). The guidance would clarify, as noted in the Decommissioning GEIS and the SOC for the 1996 rulemaking, that if a licensee identifies significant environmental impacts associated with site-specific decommissioning activities that are not bounded by the Decommissioning GEIS or other NEPA reviews, then the licensee must either address those impacts as part of a request for a license amendment at some time before performing the activities, not perform the activities, or modify the activities so that the unbounded environmental impacts would not occur. Licensees could also request an exemption. If a licensee submits a license amendment or exemption request, then the NRC would prepare an EA, or other appropriate NEPA document, and complete any necessary consultations. This guidance update would also address public comments noting (1) that the NRC's reliance on the Decommissioning GEIS to generically resolve and bound environmental impacts at specific sites may not be adequate and (2) that the Decommissioning GEIS states that the NRC would evaluate any site-specific environmental impacts not previously reviewed subsequent to the submittal of the PSDAR.

In addition to enhancing the guidance on PSDAR preparation in RG 1.185, Revision 1, and the overall decommissioning process as described in RG 1.184, Revision 1, "Decommissioning of Nuclear Power Reactors," issued October 2013 (ADAMS Accession No. ML13144A840), the NRC staff could revise the Decommissioning GEIS, which was last updated in 2002. Potential revisions could entail (1) including experience from recent decommissioning facilities, (2) incorporating the conclusions of NUREG-2157, Volumes 1 and 2, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel," issued September 2014 (ADAMS Accession No. ML14198A440), which is also known as the Continued Storage GEIS, (3) revisiting the Decommissioning GEIS findings based on updated information including comments received on the rulemaking, and (4) revising as necessary to reflect the outcome of the current rulemaking activities. In addition, the staff would incorporate best practices and lessons learned from environmental reviews conducted for other NRC applications. The staff would also evaluate the process for implementing the Decommissioning GEIS and make any necessary enhancements to the document. The staff would revise the Decommissioning GEIS on a separate schedule from this rulemaking because of the additional public interactions and engagement with other Federal agencies that occur during a NEPA review.

The NRC could also update IMC 2561 and the associated Inspection Procedure (IP) 71801, "Decommissioning Performance and Status Review at Permanently Shutdown Reactors," dated August 11, 1997, to appropriately address the NRC's inspection and oversight responsibilities related to 10 CFR 50.82(a)(6)(ii). The changes to these documents would be discussed with the affected NRC inspection and oversight staff, and all proposed changes would be provided for feedback and comment to the appropriate NRC inspection and oversight organizations before implementation of any changes.

2.2.2.2 Assessment of Option 2

Selection of this option would provide licensees in decommissioning with guidance on additional detail to include in the PSDAR on topics that the PSDAR is already required to cover. This guidance would address those aspects for which the NRC staff has historically needed to engage with licensees to obtain a more complete understanding as part of the agency's ongoing oversight of the decommissioning process. This approach would also add transparency by addressing issues that concern many stakeholders, without the need to further formalize the PSDAR content in the NRC regulations. This would continue to provide the flexibility needed by many sites in various stages of the decommissioning process. As most licensees tend to use RG 1.185, Revision 1, and the Decommissioning GEIS as the roadmap for assembling decommissioning documents to be submitted to the NRC, appropriate guidance updates related to the PSDAR and the Decommissioning GEIS could lead to improvements in the documents that licensees submit to the NRC and a more efficient review of the PSDAR by the NRC.

2.2.3 Option 3—Rulemaking for Specific Issues

2.2.3.1 Description of Option 3

In this option, the NRC staff would pursue rulemaking in one or more specific areas related to the PSDAR review process. These rulemaking alternatives are (1) implementation of a specific requirement for licensees to address stakeholder comments received during the PSDAR review process, (2) required periodic updates to the PSDAR (e.g., every 5 years), (3) required NRC review and approval of the licensee's evaluation of environmental impacts associated with site-specific decommissioning activities, and (4) clarification of the current requirements that licensees must evaluate the environmental impacts associated with site-specific decommissioning activities before performing the activities. Some stakeholders have identified these areas as shortcomings in the current PSDAR review process.

As warranted, the staff would revise 10 CFR 50.82(a)(4) through 10 CFR 50.82(a)(7) to make one or more of the following changes to the PSDAR review process:

A. Require that stakeholder comments received on the PSDAR, including State and local government input and feedback, be specifically dispositioned by the licensee. The licensee would be required to address any comments formally provided before the PSDAR could be implemented.

   NRC Staff Assessment: The NRC staff considered the potential benefit from increased public engagement on the PSDAR in this manner and concluded that the additional burden to the licensee of providing written responses was not justified given the opportunities that already exist in the process. Specifically, (1) the current PSDAR review process is already open to comments from all stakeholders; (2) these comments are collected along with additional feedback from the accompanying PSDAR public

meeting that is held in the vicinity of each decommissioning reactor site within 90 days of submittal of the PSDAR; and (3) all comments received are captured in the acknowledgment letter to the licensee. This letter summarizes the staff's assessment of the PSDAR, against the requirements in 10 CFR 50.82(a), and categorizes the stakeholder comments received on the PSDAR.

The NRC staff considered whether requiring a response would provide a public health and safety benefit that would justify the imposition of this requirement. In accordance with the current PSDAR review process, the NRC staff already addresses through the RAI process any shortcomings in the PSDAR identified by the NRC staff or via a substantive comment on the PSDAR. The licensee's response to the RAIs is evaluated to determine if the PSDAR satisfies the information requirements in 10 CFR 50.82(a)(4); this determination is required before major decommissioning activities can begin. In many cases, these interactions with the NRC staff and other stakeholders have caused licensees to update or alter the information contained in the PSDAR. As necessary, the NRC will raise any further deficiencies with the licensee in subsequent interactions, including additional letters, public meetings, or onsite inspections. If licensees choose not to respond to RAIs or address deficiencies in a manner that satisfies the current decommissioning requirements, they could be subject to enforcement actions by the NRC. In addition, specific safety or compliance concerns identified by stakeholders on the licensee's decommissioning activities could be brought to the NRC's attention via other avenues, such as through the NRC's Allegation Program or the 10 CFR 2.206, "Requests for action under this subpart," petition process.

Therefore, maintenance of the current practice best supports the agency's mission of openness and transparency in the regulatory process, while considering all viewpoints to the extent practical.

B. Require licensees to update all PSDARs periodically to include the additional decommissioning details that are not resolved until later in the decommissioning process (e.g., site characterization and remediation plans), as well as to update the overall schedule, work planning, and final site disposition discussion.

NRC Staff Assessment: In accordance with 10 CFR 50.82(a)(7), licensees are already required to notify the NRC and any affected States in writing before "performing any decommissioning activity inconsistent with, or making any significant schedule change from, those actions and schedules described in the PSDAR, including changes that significantly increase the decommissioning cost." An additional requirement to periodically update the PSDAR regardless of the level of activity at the decommissioning site, or how closely these activities are following the outline of the PSDAR, would decrease the flexibility and efficiency available to licensees in decommissioning without a commensurate increase in public health and safety.

Specifically, while the level of NRC oversight at decommissioning facilities is less than that at operating facilities, oversight nonetheless continues. Periodic inspections in many regulatory and technical areas take place under the decommissioning reactor inspection program, in accordance with IMC 2561, at least annually. These inspections ensure that the NRC staff remains well informed of ongoing activities at the facility, is promptly made aware of any issues, and has the opportunity to follow up on corrective actions. The results of these inspections are available to the public in inspection reports that can be obtained from many sources, including the NRC public Web site and

ADAMS, and are distributed directly to interested stakeholders who subscribe to either electronic distribution or the site service list. Additionally, 10 CFR 50.82(a)(8)(v) requires licensees to submit to the NRC annual financial assurance status reports, which include the amount spent on decommissioning to date, the remaining balance of decommissioning funds, and an updated estimate of the cost to complete decommissioning. Therefore, a requirement to periodically update the PSDAR would impose an additional burden on licensees that would not result in an increase in safety.

C. Require the PSDAR discussion that provides the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate previously issued environmental impact statements to be submitted to the NRC for review and approval.

NRC Staff Assessment: A submission of the PSDAR environmental discussion to the NRC for review and approval would trigger the NRC's responsibilities under environmental statutes. The NRC's resultant NEPA review would focus on those environmental impacts that are not bounded by previous environmental analyses. By starting the environmental review process earlier in decommissioning, the public would have an opportunity to participate in the decommissioning process before the occurrence of many major decommissioning activities.

This rulemaking alternative would address concerns raised by stakeholders requesting a site-specific NEPA analysis earlier in the decommissioning process. By conducting a NEPA review at the PSDAR stage, all of the environmental impacts of the planned decommissioning activities would be considered and bounded as of the time that the PSDAR is submitted. Therefore, there would be no need for the regulations in 10 CFR 50.82(a)(6)(ii) to prevent a licensee from performing activities that would result in impacts that have not been previously reviewed. Instead, to the extent that the planned decommissioning activities described in the PSDAR change after the PSDAR is submitted, the licensee would be required to submit an environmental evaluation related to the changed decommissioning activities to the NRC for its review and approval. With this alternative, the NRC would review environmental impacts at the PSDAR stage (except for those associated with subsequently changed decommissioning activities, which would be reviewed at the time of the change) and not again until LTP submittal.

During its assessment of this rulemaking alternative, the NRC staff noted that, based on an evaluation of the authority given to the NRC by the Atomic Energy Act of 1954, as amended (AEA), the NRC has no authority to require that an environmental analysis be submitted for review and approval where there is no specific action pending before the agency. Therefore, the NRC staff has determined that the selection of this alternative is not possible under the NRC's current statutory authority.

D. Modify the rule language in 10 CFR 50.82(a)(4) to clarify that licensees must evaluate the environmental impacts of planned decommissioning activities in the PSDAR and whether the impacts are bounded by previous federally issued environmental review documents. Currently, the rule language indicates that the licensee must provide the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate previously issued environmental impact statements. The rule change would clarify that licensees must evaluate the environmental impacts and determine *whether* they are bounded. If unbounded impacts are identified, then, consistent with 10 CFR 50.82(a)(6)(ii), the

licensee can address those impacts before the associated activity occurs instead of being required to address those impacts at the PSDAR stage. This rulemaking alternative would not require, in contrast to Rulemaking Alternative C, that the licensee submit the environmental analysis to the NRC for review and approval.

Other recommended clarifications include: (1) revising the regulatory language to reflect that any federally issued environmental document, such as an EA or a biological opinion, could be used by licensees to demonstrate that the environmental impacts of decommissioning activities are bounded; (2) clarifying the need to consider environmental impacts when notifying the NRC of changes to planned decommissioning activities; and (3) making changes to 10 CFR 51.53 and 10 CFR 51.95 to clarify the environmental reporting requirements and add an appropriate reference to 10 CFR 52.110 to clarify that reactors licensed under 10 CFR Part 52 will perform decommissioning under 10 CFR 52.110.

NRC Staff Assessment: NRC regulation 10 CFR 50.82(a)(6)(ii) allows licensees to perform decommissioning activities without prior evaluation under NEPA for those decommissioning activities that will not result in significant environmental impacts not previously reviewed. This rulemaking change would clarify that licensees at the PSDAR stage are required to evaluate the environmental impacts and to state whether or not the proposed decommissioning activities identified in the PSDAR are bounded by previously issued, site-specific environmental review documents. Licensees would only be required to take the necessary action to address any decommissioning activity that would be prohibited by 10 CFR 50.82(a)(6)(ii) (i.e., result in a significant environmental impact not previously reviewed) prior to taking such decommissioning activity. In this regard, the action would be for the licensee to submit a license amendment or exemption request, thereby triggering an environmental review of an action not previously reviewed, or modify the proposed decommissioning activity so it would not result in a significant impact not previously reviewed (e.g., through mitigation, taking an alternative approach, or using a different process to complete the decommissioning activity).

In addition, as part of this rulemaking alternative, the NRC would make changes to 10 CFR 51.53 and 10 CFR 51.95 to clarify the environmental reporting requirements, as well as ensure that reference to “decommissioning plans” applies only to non-power reactor licensees, because use of a DP is no longer applicable to power reactor licensees after the 1996 decommissioning rulemaking that required these licensees to submit PSDARs instead of DPs. The NRC would also add to 10 CFR 51.53 a cross-reference to 10 CFR 52.110, since reactors licensed under 10 CFR Part 52 will perform decommissioning under 10 CFR 52.110, not 10 CFR 50.82, although the requirements for the LTP are the same as those in 10 CFR 50.82.

This rulemaking alternative would reduce regulatory burden on the licensee by removing the duplicative requirement to address unbounded impacts at both the PSDAR stage and before performing each decommissioning activity that would result in a significant impact not previously reviewed. The change would also result in more accurate analyses of environmental impacts because the analyses would be conducted closer to the date of the performance of the associated decommissioning activity. This amendment would be consistent with the purpose of the PSDAR as a mechanism for NRC oversight because it would alert the NRC to any unbounded environmental impacts. Compliance with 10 CFR 50.82(a)(6)(ii) would ensure that licensees do not perform the associated decommissioning activity without first addressing any significant

environmental impacts not previously reviewed. Licensees could address such environmental impacts by requesting a license amendment or exemption before the associated decommissioning activity occurs, not performing the activity, or modifying the activity so that the significant environmental impact does not occur. The submission of a license amendment or exemption request would trigger NRC responsibilities under environmental statutes. The clarifying changes to 10 CFR 51.53 and 10 CFR 51.95 would impose no burden on licensees or the NRC staff.

2.2.3.2 Assessment of Option 3

Depending on the portion of this option selected, the impact on both licensees in decommissioning and the NRC staff could range from low to high. Licensees would need to expend more time and effort to provide the additional level of feedback or documentation required as part of the specific rulemaking changes. The NRC staff would be required to promulgate new rule language. Specifically, Option 3A would increase burden on licensees without a commensurate increase in public health and safety, compared to the current RAI process. Furthermore, it would not provide a substantial improvement in public engagement over the current framework given the provisions that already exist for the NRC to obtain and consider stakeholder feedback during the PSDAR review period. Option 3B would decrease the flexibility and efficiency available to licensees without a commensurate increase in public health and safety. The suggested rulemaking change under Option 3C, amending the rule language of 10 CFR 50.82 to require NRC approval of the environmental evaluation submitted as part of the PSDAR is not related to nuclear safety and, therefore, the NRC staff determined that it is not within the NRC's authority under the AEA to make such a rule change.

The suggested rulemaking change under Option 3D 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 requirements 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 staff, 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. As use of any of these rulemaking alternatives would also include the development of implementing guidance, the assessment for Option 2 (Section 2.2.2) for guidance development or enhancement would apply to this option.

2.2.4 Option 4—Rulemaking to Require PSDAR Approval

2.2.4.1 Description of Option 4

In this option, the NRC would pursue rulemaking to change the regulations in 10 CFR 50.82 to require NRC review and approval of the PSDAR, similar to the requirements that existed before the 1996 decommissioning rule was implemented. Specifically, these modified regulations would require that the PSDAR be submitted as a license amendment request, which would give affected stakeholders an opportunity to submit comments and request a hearing on the PSDAR, and that the NRC conduct review and approval of the PSDAR. In addition, because the NRC would undertake a licensing action, the NRC staff would conduct an environmental review in accordance with NEPA and other environmental statutes. Until the NRC approves the PSDAR,

the licensee would not be permitted to begin any major decommissioning, unless specifically approved in advance by the NRC.

Under this option, the NRC would require that the PSDAR be submitted as a license amendment request in accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit." This means that the PSDAR would be subject to the same level of review as other license amendment requests. Specifically:

- the licensee would submit the PSDAR for review by the NRC;
- the document would be noticed in the *Federal Register* for a public comment period, and stakeholders would be able to request a hearing on all or portions of the PSDAR;
- the PSDAR would include an environmental report;
- the NRC would review the document to ascertain whether it contains enough detail on the decommissioning process to ensure that the activities would not have a negative impact on public health and safety; and
- the NRC would conduct a safety evaluation and an environmental review giving the conclusions of the agency's assessment of the PSDAR and, if approved, allowing the licensee to begin major decommissioning activities.

2.2.4.2 Assessment of Option 4

Selection of this option would reinstate the decommissioning planning review requirements removed from the regulations by the 1996 decommissioning rule, which allowed the PSDAR to be submitted to the NRC with no agency approval of the document. Under 10 CFR 50.82(a)(7), licensees are only required to notify the NRC when decommissioning activities vary significantly from those first proposed in the PSDAR. As discussed previously, one of the main drivers for the 1996 rule, beyond the recognition that decommissioning power reactors inherently pose less risk to the public than operating facilities, was to provide more flexibility in dealing with premature closures and the decommissioning process in general while establishing "a level of NRC oversight commensurate with the level of safety concerns expected during decommissioning activities" (61 FR 39279). The primary method for increasing this flexibility was removal of the NRC's approval of a DP in favor of a licensee's submittal of the PSDAR to streamline the process. Therefore, reinstating an approval requirement for the PSDAR would be contrary to the goals of the 1996 decommissioning rule, as well as the efficiency improvements that are one objective of the current rulemaking.

NRC approval of the PSDAR would be an NRC licensing action, which would trigger the NRC's responsibilities under NEPA and related environmental statutes. Licensees would also be required to submit an environmental report in accordance with 10 CFR 51.53(d) as part of the PSDAR submittal. Implementing NEPA at the PSDAR stage would allow the NRC to evaluate the environmental impacts of decommissioning before the facility is largely dismantled. Further, once the NRC has completed its NEPA review and the associated consultations, there would no longer be a need for the regulatory constraint of 10 CFR 50.82(a)(6)(ii), or the need for NRC oversight to ensure compliance with that regulation because all the site-specific impacts would have been addressed at the PSDAR stage. Instead, the regulations would have to specify that, in cases where planned decommissioning activities change in a way that could significantly

affect the NRC's environmental findings made at the time of the PSDAR submittal, the licensee would be required to amend the license condition describing the PSDAR, at which point, the NRC staff would conduct a new environmental analysis.

Licensees and the NRC could incorporate by reference previous site-specific and generic EISs to support their environmental analysis as appropriate. Conducting the environmental review earlier in the decommissioning process would give stakeholders, including the public and other State and Federal agencies, an earlier opportunity to participate in the decommissioning process before many major dismantlement and disposal activities occur. By preparing a NEPA document and completing consultations upon submittal of the PSDAR, the NRC could rely on that NEPA analysis and those consultations to address many of the environmental impacts that must also be addressed when the LTP is submitted, which requires an accompanying EA.

Very few decommissioning projects were announced between implementation of the 1996 rule and the recent set of shutdown facilities. Therefore, there has been little opportunity to quantitatively measure the efficiencies added by implementation of the 1996 decommissioning rule change, in which the NRC is not required to approve the licensee's approach before major decommissioning activities, as defined in 10 CFR 50.2, are initiated. However, based on lessons learned and experiences from previously decommissioned reactors, there is currently no indication that requiring only the submission of a PSDAR, but not NRC approval, instead of a DP, has any substantial impact on the public health and safety, or that use of a PSDAR in any way diminishes the planning, preparation, and oversight conducted by the licensee or the NRC on decommissioning activities. Additionally, the current process already requires an environmental analysis by the licensee at the PSDAR stage, NRC review (but not approval) of the PSDAR, and NRC review and approval of the LTP, which provides the site-specific decommissioning approach that the licensee will take to satisfy the appropriate radiological release criteria at the time of license termination. Further, a return to the NRC approving the PSDAR would remove several of the efficiencies and flexibilities envisioned by the 1996 decommissioning rule without an accompanying increase in public health and safety.

2.3 Regulatory Scope

The NRC staff would amend 10 CFR 50.82, as applicable.

2.4 NRC Guidance, Policy, and Implementation Issues

The NRC would revise RG 1.184 and RG 1.185 and update IMC 2561, IP 71801, and NUREG-0586 to reflect the changes described in Option 2 and parts of Option 3. Any update to the Decommissioning GEIS would be on a different schedule than that of other guidance documents recommended to be revised as part of this decommissioning rulemaking.

2.5 Impacts on Public Health, Safety, and Security

2.5.1 Option 1—No Action

The no-action option would retain the current regulations for NRC review without approval of the PSDAR, the level of detail contained in the PSDAR, and the submission of written notifications of changes to planned decommissioning activities.

2.5.1.1 Impacts on Public Health, Safety, and Security

Maintaining the status quo will have no impact on public health, safety, and security. The NRC would continue the current practice of review, but not approval, of the PSDAR, and would also continue ongoing oversight and inspection of the decommissioning process. These activities will ensure that the NRC staff and other stakeholders maintain a level of awareness of decommissioning activities at a particular site that is commensurate with the reduced health and safety risks that are present at a decommissioning power reactor.

2.5.1.2 Impacts on Licensees

Use of this option would have no impact on licensees because the level of effort and associated burdens related to preparation and submittal of the PSDAR will be unchanged.

2.5.1.3 Impacts on the NRC

Use of this option would have no impact the NRC staff because the level of effort and associated burdens related to review of the PSDAR will be unchanged. Taking no action will also eliminate staff time dedicated to the rulemaking process.

2.5.1.4 Additional Considerations

Maintaining the current regulations with respect to PSDARs would continue to meet the safety and regulatory goals envisioned by the 1996 decommissioning rule, would maintain regulatory efficiency and flexibility, and would have no additional impact on plants transitioning to a decommissioning status in the future.

2.5.1.5 Summary of Benefits and Costs

Maintaining the current requirements for the areas to be included and the level of detail in the PSDAR, the NRC's review of the PSDAR, and implementation of the 10 CFR 50.59 process to enact changes at a decommissioning facility ensures protection of public health and safety and has no additional impact on the NRC or licensees in the decommissioning process.

2.5.2 Option 2—Guidance Development or Enhancement

Under this option, the NRC would update RG 1.185, Revision 1, to add details on topics already required to be included in the PSDAR in the areas of greatest interest to those impacted by the decommissioning process. In addition, the NRC would update IMC 2561 and IP 71801 to better reflect the agency's responsibilities under 10 CFR 50.82(a)(6). The agency would also update the Decommissioning GEIS on a separate timeframe from this rulemaking, as previously discussed. Before being finalized, all of these documents would be available in draft for review and comment by affected stakeholders.

2.5.2.1 Impacts on Public Health, Safety, and Security

The recommended guidance updates would maintain the current level of public health, safety, and security, and would increase the level of transparency and promote greater understanding by the general public and other stakeholders of the overall decommissioning process.

2.5.2.2 Impacts on Licensees

Use of this option would have a small impact on licensees in decommissioning because it would potentially require licensees to increase the level of detail in the documentation provided in the PSDAR. However, because the proposed updates to the guidance would reflect additional details on information that licensees are already required to submit in the PSDAR, and which is generally already available to and used by licensees, licensees using this guidance would expend minimal additional resources.. In addition, the NRC staff routinely asks questions on the information submitted in PSDARs via RAIs, and licensees respond accordingly. These interactions increase the burden on both parties. The increased level of detail in the guidance and submittals recommended under this option would reduce the NRC staff's need to ask the licensee additional questions as part of the staff's PSDAR review.

2.5.2.3 Impacts on the NRC

Use of this option would have a small to moderate impact on the NRC staff because it would require an update to RG 1.184, Revision 1, RG 1.185, Revision 1, IMC 2561, and IP 71801 in the near term, and additional staff resources would be needed to review a potentially expanded level of detail in the PSDARs being submitted. Updates to the Decommissioning GEIS would require a larger effort by the NRC staff as already discussed. Although the NRC would need to expend additional resources in the near term to develop the guidance in RG 1.184 and RG 1.185, both the NRC and licensees would eventually save resources because the additional information provided would result in a more streamlined and predictable process. Further, such enhanced guidance and the associated submittals would help the NRC better plan resource needs for future decommissioning reviews. Also, this option would result in a greater level of overall regulatory transparency and openness in the NRC's decommissioning process for external stakeholders, which would offset this increased burden on the NRC staff to update guidance documents. Finally, this option would reduce the need of the NRC staff to have to request the submission of additional information after PSDARs have been submitted.

Efforts to update IMC 2561 and IP 71801 would have a small impact on the NRC staff, primarily because an update to IMC 2561 in its entirety is already underway, and the changes recommended as part of this rulemaking activity could be incorporated into that ongoing project with the expenditure of minimal additional resources. The updates to the decommissioning inspection guidance documents would have a small impact on licensees related to the environmental documentation that would be needed to support inspections and the potential for findings related to 10 CFR 50.82(a)(6)(ii) to be identified under the revised IP 71801. As noted above, the Decommissioning GEIS update would proceed on a separate timeline than that of the other guidance documents and would represent a larger burden to the NRC staff given the larger task of updating the Decommissioning GEIS.

2.5.2.4 Additional Considerations

Implementation of this option would have a relatively small impact on the NRC staff and licensees in decommissioning because it would require the staff to update RG 1.185, Revision 1, in the near term and should lead to licensees increasing the level of detail in the documentation that they provide in their PSDARs. While these changes would minimally increase the burden on licensees, they would also increase awareness of the decommissioning process among the NRC staff, members of the public, and other stakeholders; potentially reduce the need for NRC staff requests for additional information from licensees; and increase overall regulatory transparency and openness. In addition, the recommended updates would

add clarity and consistency to the guidance. These recommended changes would also apply the principles of good regulation: independence, clarity, openness, reliability, and efficiency.

2.5.2.5 Summary of Benefits and Costs

Use of this option would increase the level of detail in the PSDARs, which should lead to a better understanding of licensees' decommissioning processes by all stakeholders. This recommendation would maintain the current level of public health, safety, and security, and it would increase the level of clarity, openness, reliability, and efficiency.

2.5.3 Option 3—Rulemaking for Specific Issues

In this option, the NRC staff would pursue rulemaking in one or more specific areas related to the review of the PSDAR and the consideration of environmental impacts. The amended language could include provisions for the following:

A. required response by licensees to stakeholder comments received during the PSDAR review process;

B. required periodic updates to the PSDAR (e.g., every 5 years);

C. required NRC review and approval of the licensee's environmental evaluation of decommissioning impacts included in the PSDAR; and

D. clarification that licensees must evaluate all environmental impacts and state whether they are bounded at the time of PSDAR submittal.

The NRC would add new language, as warranted, to 10 CFR 50.82(a)(4) through 10 CFR 50.82(a)(7) to address one or more of these areas.

2.5.3.1 Impacts on Public Health, Safety, and Security

Use of Option 3D would maintain the current level of public health, safety, and security, increase the level of transparency, and promote a greater understanding by the general public and other stakeholders of the environmental impacts of decommissioning.

2.5.3.2 Impacts on Licensees

Implementation of any of the first three rulemaking alternatives (Options 3A, 3B, and 3C) would have a moderate to high impact on licensees as licensees would need to expend more time and effort to provide the additional level of feedback, documentation, and other resources required as part of the new regulations. Option 3C could also cause a delay in the licensee's decommissioning schedule as it waits for the regulatory review process to be completed.

Use of Option 3D would reduce the burden on decommissioning licensees because they would no longer need to develop a statement at the time of PSDAR submittal concluding that all of the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate previously issued environmental impact statements. This alternative would reduce the potential for not complying with the regulation if the licensee is unable to determine that all environmental impacts are bounded at the PSDAR stage. The change would also relieve licensees of the potential burden of addressing those decommissioning activities that

would be unbounded at the PSDAR stage, which they may not take any action on until many years in the future, when site-specific circumstances may have changed. These changes would decrease the burden on licensees and increase the transparency of the decommissioning process among the NRC staff, members of the public, and other stakeholders.

2.5.3.3 Impacts on the NRC

Implementation of any of the first three rulemaking alternatives (Options 3A, 3B, and 3C) would have a moderate to high impact on the NRC staff as it would require the NRC staff to promulgate new rule language for the imposition of several regulations.

Although the NRC staff would promulgate new rule language, use of Option 3D would have a negligible impact on the NRC staff because it would be consistent with the purpose of the PSDAR as a mechanism for NRC oversight as it would alert the NRC to any unbounded environmental impacts. Through 10 CFR 50.82(a)(6)(ii), the NRC is able to take enforcement action if the licensee performs a decommissioning activity that results in a significant environmental impact not previously reviewed. Licensees could address those impacts by submitting a license amendment or an exemption request before conducting the proposed decommissioning activity, not performing the activity, or modifying the activity so as to prevent a significant environmental impact not previously reviewed from occurring.

2.5.3.4 Additional Considerations

The recommended changes would apply the principles of good regulation: independence, clarity, openness, reliability, and efficiency.

2.5.3.5 Summary of Benefits and Costs

Use of Option 3D would reduce licensees' regulatory burden related to the need to bound the environmental impacts of decommissioning activities at the PSDAR stage, and would have minimal impact on the NRC staff. This recommendation would maintain the current level of public health, safety, and security, and would increase the level of transparency and clarity.

2.5.4 Option 4—Rulemaking to Require PSDAR Approval

This option would require NRC review and approval of the PSDAR before the license could begin decommissioning activities.

2.5.4.1 Impacts on Public Health, Safety, and Security

There is no indication that requiring review and approval of the PSDAR would increase public health and safety, or enhance security.

2.5.4.2 Impacts on Licensees

Use of this option would have a high impact on licensees. For example, licensees would expend additional effort in preparing a PSDAR sufficient for NRC approval, including responding to requests for information from the NRC and other stakeholders. Licensees would also need to delay major decommissioning activities while the PSDAR review is underway. The changes would decrease licensees' flexibility in conducting decommissioning activities, thereby decreasing efficiency and potentially delaying decommissioning activities while the regulatory

process is completed. In particular, as the PSDAR would be submitted for approval in the form of a license amendment request, there would also be an opportunity for a hearing. Litigation arising from the PSDAR submission could significantly delay the decommissioning process. The litigation costs associated with a hearing and any appeals would likely be significant for both the licensee and the NRC.

2.5.4.3 Impacts on the NRC

Use of this option would have a high impact on the NRC. It would require the NRC staff to:

- promulgate new rule language for the imposition of regulations that are contrary to the goals of the 1996 decommissioning rule and the objectives of the current rulemaking;
- develop a regulatory and technical basis in support of conclusions that diverge from the current decommissioning process;
- create a new review standard for PSDARs that would be submitted for approval as license amendment requests;
- conduct an assessment of whether imposing the new rule would constitute backfitting under 10 CFR 50.109, "Backfitting," or violate issue finality under 10 CFR Part 52;
- potentially expend significant resources to prepare for hearing-related activities as well as any appellate action; and
- expend resources to conduct the associated environmental reviews and consultations that would be necessary if the PSDAR were subject to approval.

2.5.4.4 Additional Considerations

The existing PSDAR process already provides an opportunity for stakeholder feedback, including a public meeting held in the vicinity of the licensee's facility, as well as an opportunity for hearing and a public meeting when the licensee submits the LTP. The NRC staff expects that any health and safety concerns would be identified and addressed during these existing processes, as well as during the ongoing NRC inspection and oversight activities that take place throughout decommissioning in accordance with IMC 2561 and other regulatory interactions.

2.5.4.5 Summary of Benefits and Costs

Changing the current requirements to impose new requirements for NRC review and approval of the PSDAR would have a high impact on both licensees and the NRC without a corresponding increase in the level of protection of public health and safety. However, interested stakeholders who satisfy the requirements for intervention could request a hearing.

2.6 Backfitting and Issue Finality Considerations

Currently, the NRC does not expect that the recommended options in this section of the appendix would constitute backfitting under 10 CFR 50.109 or violate any issue finality provision in 10 CFR Part 52. Option 1 would maintain the status quo of the current regulations for NRC review without approval of the PSDAR, the level of detail contained in the PSDAR, and the

submission of written notifications of changes to planned decommissioning activities. Option 2 would establish guidance, but not require its use, for providing an additional level of detail in the PSDAR on topics already required to be covered that have concerned many stakeholders. Further formalization of PSDAR content in the NRC regulations would not be necessary. Option 3D would clarify the current regulations in 10 CFR 50.82, which require that licensees evaluate the environmental impacts of decommissioning activities and whether they are bounded at the PSDAR stage, while still ensuring that the licensee does not perform decommissioning activities that would result in significant environmental impacts not already reviewed. Licensees would continue to have the option to resolve unbounded environmental impacts by either requesting a license amendment for the associated decommissioning activity, by not performing the activity, or by modifying the activity to avoid causing the unbounded impact. Changes to the PSDAR regulations would not constitute backfitting as defined in 10 CFR 50.109 or a violation of issue finality under 10 CFR Part 52 because the PSDAR regulations are reporting requirements, which are not subject to backfitting or issue finality requirements. Other parts of Option 3 and Option 4, if selected, would implement new decommissioning requirements related to the contents of, or NRC approval of, the PSDAR that could constitute a backfit under 10 CFR 50.109 or a violation of issue finality under 10 CFR Part 52. Selection of any of these options would necessitate a backfit assessment by the NRC.

2.7 Stakeholder Feedback on Draft Regulatory Basis

2.7.1 Feedback from Rulemaking Public Meetings

The NRC held two public meetings, one on December 9, 2015, to discuss the ANPR, and another on May 8–10, 2017, to discuss the draft regulatory basis and preliminary draft regulatory analysis for a future rulemaking on decommissioning commercial nuclear power plants. During these meetings, the NRC staff received feedback regarding the current process for reviewing PSDARs and how any deficiencies identified in a PSDAR could affect the decommissioning process. Most of these stakeholders asked that the NRC reinstate the requirement for NRC approval of the PSDAR and a site-specific environmental review under NEPA with all the associated comment and hearing rights. The NRC staff considered these observations in preparing its recommendations in this appendix.

2.7.2 Main Themes from Public Comment Submissions

During the public comment period for the draft regulatory basis, as part of the more than 40 submissions received, the NRC received roughly 25 comment submissions directly related to Appendix H. Some comments stated that the rulemaking scope should be limited to those areas that have required licensing activities and are consistent with areas addressed in SECY-00-0145, “Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning,” dated June 28, 2000. Specifically, those commenters opposed the changes to agency guidance discussed in Option 2 of this section and stated that the NRC’s guidance on the content of PSDARs should focus on the information necessary for the agency to fulfill its regulatory responsibilities for the review of the PSDAR and oversight of the decommissioning process. Further, the commenters indicated that (1) the current requirements and guidance ensure that the PSDARs are sufficiently detailed to allow the NRC to evaluate compliance and ensure adequate protection of the health and safety of the public in an open and transparent manner; (2) there is no valid regulatory basis for the NRC to modify its guidance to “encourage” licensees to provide additional detail in the PSDAR; and (3) including such guidance in RG 1.185, RG 1.184, or both would potentially increase the licensee’s reporting burden with no

corresponding improvement to safety or security, while also contradicting the NRC's stated objective for this rulemaking activity of improving decommissioning efficiency.

Comments on the NRC's obligations under NEPA were similar to those received on the ANPR and the 1996 decommissioning rulemaking. Commenters made two main arguments: (1) decommissioning is a major Federal action and thus requires a NEPA review, and (2) a site-specific NEPA review is necessary as the Decommissioning GEIS does not resolve all site-specific issues or take into account all site-specific factors. Commenters reiterated their opinion that decommissioning is a major Federal action—one that requires NRC oversight and responsibility—and thus requires a NEPA review whether or not there is a specific NRC licensing action. One commenter suggested that the NRC reconsider its position such that the NRC could conduct a NEPA review and associated consultations at the PSDAR stage even though there is no approval of the PSDAR, and thus no agency action. Commenters referenced the 1995 *Citizens Against Nuclear v. NRC* court decision (59 F.3d 284). However, that court decision was issued before the 1996 decommissioning rulemaking. These commenters also raised several issues that they believe have never been evaluated on a site-specific basis as they relate to decommissioning, such as socioeconomic impacts, environmental justice, seismic concerns, groundwater contamination, threatened and endangered species, and historic and archeological resources. The commenters noted that the NRC's reliance on the Decommissioning GEIS to generically resolve and bound issues at specific sites may not be adequate because the NRC has determined that some resources require site-specific analysis.

Other comments argued that the NRC must expressly recognize State authority over the nonradiological activities associated with nuclear power reactor decommissioning. These stakeholders contend that while the NRC has authority over the radiological aspects of power reactor decommissioning, the host State retains authority to regulate nonradiological activities and nonradiological waste at nuclear power plants. Additional comments related to the need for the PSDAR to contain more information on radiological characterization because it is an essential and critical aspect in the planning stage for the decommissioning of any facility that has handled radioactive materials. The specific aspects of this information could include sources of radioactivity, contamination levels, radionuclides important for decommissioning, the timing of decommissioning from a radionuclide inventory standpoint, selection of the appropriate measurement technique for waste characterization, and recordkeeping requirements.

2.7.3 NRC Response to Comments

In response to the comments received on the draft regulatory basis, the NRC staff has modified parts of the recommended changes to RG 1.185 to reflect more fully the type of information that the NRC is seeking in the PSDAR as part of the recommended guidance update. Specifically, RG 1.185 would no longer recommend that licensees include a discussion of the cost estimate over time of the decommissioning strategies not chosen in the PSDAR because the site-specific DCE is sufficient to meet the regulatory requirements for describing decommissioning expenses. In response to comments, the NRC is also removing its recommendation to include in guidance areas that are outside the scope of the current rulemaking activity or not appropriate to address in the early phases of decommissioning typically captured in the PSDAR.

In addition to these changes, the NRC staff removed discussion of the potential for early submittal of the LTP in the decommissioning process because (1) licensees already know that they can submit the LTP at any time in the decommissioning process before 2 years from license termination, and (2) the overall timing of decommissioning is a decision left to the licensee, as long as it can be completed within 60 years. The NRC staff also notes that the

specific radiological characterization information for a decommissioning site is available upon submission of the LTP and available for public inspection. In addition, several comments contend that the current LTP process removed an opportunity for meaningful public involvement in the decommissioning process because the occasion for public comments and potential requests for a hearing occurs later in the decommissioning process rather than at the PSDAR stage. However, the NRC will continue to hold public meetings in the vicinity of the licensed facility for PSDAR submissions, partial site release requests, and LTP submissions, thereby giving the public and other stakeholders an opportunity to become informed about the decommissioning process. In addition, as the decommissioning activities progress to an "ISFSI-only" status with all spent fuel in dry storage, the associated licensing changes are typically submitted as license amendments, which have a public involvement aspect.

Recognizing that the Decommissioning GEIS does not generically resolve all site-specific environmental impacts for decommissioning, the NRC has also modified its recommended changes to RG 1.185 to clarify what a licensee needs to do if a proposed decommissioning activity would result in an unbounded environmental impact not previously reviewed (i.e., either submit a license amendment or exemption request for the decommissioning activity, not perform the activity, or modify the activity so that the unbounded environmental impact not previously reviewed does not occur). If the licensee chooses to submit a license amendment or exemption request, this submission would trigger the NRC's responsibilities under NEPA and related environmental statutes and thus resolve the issue of unbounded environmental impacts not previously reviewed. In response to comments, the NRC staff also added a recommendation to initiate rulemaking to clarify that licensees must evaluate the environmental impacts of decommissioning activities at the PSDAR stage to determine whether they are bounded by previous environmental analyses. The NRC staff also notes that the nonradiological aspects of decommissioning are largely not within the NRC's jurisdiction, and their regulation will remain under the purview of the State or other Federal agencies that address nonradiological impacts, as was the case during facility operation.

2.8 NRC Staff Recommended Approach

The NRC staff has determined that there are no additional public health or safety improvements to be gained by further regulatory changes to the NRC's power reactor decommissioning regulations on the subject of the PSDAR. The NRC staff based this finding on its consideration of the 1996 SOC, lessons learned, stakeholder comments on the ANPR and draft regulatory basis published for this rulemaking activity, and other data that informed the Commission's 1996 decision to remove NRC approval of a DP and replace it with NRC review of a PSDAR, as well as an assessment of the ongoing decommissioning activities currently taking place under PSDAR requirements. However, the NRC staff has identified some enhancements that would improve the efficiency, effectiveness, and transparency of the process. Therefore, to reduce unnecessary regulatory burden and improve the regulatory process for decommissioning nuclear power plants, the NRC staff recommends Option 2 (Guidance Development or Enhancement), as well as a portion of Option 3 (Rulemaking for Specific Issues).

Implementation of Option 2 would allow the NRC staff and stakeholders to access more detailed information in the PSDARs for those licensees choosing to follow the enhanced guidance. The option would not reduce the flexibility provided by the use of a PSDAR instead of a DP for decommissioning nuclear power plants or impose unnecessary burdens on licensees and the NRC staff to create and review additional documents that do not have any net positive impact on public health and safety. In addition, updating the Decommissioning GEIS would allow the

NRC to incorporate more recent decommissioning experience and revisit the generic environmental impact determinations.

The NRC staff also recommends Option 3D, which 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 review documents, at the PSDAR stage, rather than making a determination that all such impacts are bounded. Licensees would still be prohibited from conducting a decommissioning activity that would result in a significant environmental impact not previously reviewed per 10 CFR 50.82(a)(6)(ii) (in this case the licensee would need to submit a license amendment or exemption request, and if approved by the NRC, would then be able to conduct the activity). The guidance updates envisioned under Option 2 would also include additional guidance for addressing environmental impacts not bounded by appropriate previously issued environmental review documents at the PSDAR stage, or deferring those discussions until later in the decommissioning process (where the concern is addressing a significant environmental impact not previously reviewed before the activity occurs).

3 TIMEFRAME ASSOCIATED WITH DECOMMISSIONING

3.1 Existing Regulatory Framework

3.1.1 Establishment of the 60-Year Timeframe for Decommissioning

The regulation at 10 CFR 50.82(a)(3) states that decommissioning will be completed within 60 years of permanent cessation of operations. The 60-year timeline described in the NRC decommissioning regulations is the result of a risk-informed performance-based decision documented in the 1988 decommissioning final rule. Specifically, the NRC based the 60-year timeline on the following factors:

- The time needed for the decay of several predominant radiological isotopes to reduce radiation exposures to workers, in accordance with the as low as reasonably achievable (ALARA) principles. Sixty years roughly corresponds to 10 half-lives for cobalt-60, one of the predominant isotopes remaining in a decommissioning nuclear reactor facility. After 50 years, most of the short-lived isotopes, which provide the most dose and exposure to workers during decommissioning, will have decayed to background levels, leaving the licensee with 10 additional years to dismantle and decontaminate the facility.

- The ability to effectively maintain safety and institutional controls throughout the project. Based on the technical data collected, the 60-year period appears to be a reasonable expectation for the maintenance of institutional controls. For periods beyond 60 years, an evaluation of the need for additional institutional controls may be required. Institutional controls include engineered controls such as fences and restrictions on the site's deed that restrict land uses such as use as a park or farming during the period of decommissioning. Institutional control could also include ownership by the Federal or State government, thus providing an additional legal mechanism to restrict access.

- The overall costs of decommissioning as a function of time.

During the 1988 rulemaking, the NRC determined that using the DECON method, or using the SAFSTOR method for up to 50 years, plus 10 years for decontamination and dismantlement

activities, would be a reasonable approach for decommissioning a light-water reactor. DECON and SAFSTOR both have benefits when chosen as the decommissioning method and can be carried out in a manner that protects public health and safety. Specifically, the benefits of DECON include the removal of contaminated systems, components, and structures to a degree that will allow for unrestricted use of the site soon after shutdown. The benefits of SAFSTOR include an allowance for radioactive decay to occur to a level that decreases the net radiological contamination remaining at the site, both in terms of potential occupational exposure and overall waste volumes created. During subsequent decommissioning rulemaking activities, this underlying technical basis for the 60-year timeframe did not change.

In selecting 60 years as an acceptable period of time for decommissioning a nuclear power reactor, the Commission considered the amount of radioactive decay likely to occur during an approximate 50-year storage period and the number of months expected to be needed to dismantle the facility. To date, 30 nuclear power reactors have permanently ceased operation. Ten reactors promptly completed decommissioning after stopping operations. Collectively, the remaining 20 power reactors have approximately 500 years of being placed in SAFSTOR, with 7 of these reactors remaining in SAFSTOR for an average of 40 years or more. Given that all of these reactors have and continue to be maintained safely in SAFSTOR, as demonstrated by NRC inspections (conducted at least annually) and oversight activities at each facility, the NRC staff has no reason to recommend changing the Commission's original determination that decommissioning can be completed safely at any time during the 60-year timeframe.

3.1.2 Extension of the 60-Year Decommissioning Timeframe

Under 10 CFR 50.82(a)(3), the Commission must approve completion of decommissioning beyond 60 years and will consider this extension only when necessary to protect public health and safety. Factors that the NRC will consider in evaluating an alternative that provides for completion of decommissioning beyond 60 years after permanent cessation of operations include unavailability of waste disposal capacity and other site-specific factors affecting the licensee's capability to carry out decommissioning, including the presence of other nuclear facilities at the site. The NRC would consider these factors as part of its review process if a decommissioning licensee requested an exemption from the 60-year timeframe.

In addition, in cases where the specific exemption criteria of 10 CFR 50.82(a)(3) cannot be met, the NRC has determined that licensees may request an exemption from the 60-year decommissioning timeframe in a manner consistent with other regulatory exemptions sought under 10 CFR 50.12, "Specific exemptions." In this situation, a licensee could use the general exemption criteria in 10 CFR 50.12 to obtain NRC approval of an alternative decommissioning timeframe if that approach meets specific requirements including one or more of the special circumstances listed in 10 CFR 50.12, is authorized by law, will not present an undue risk to public health and safety, and is consistent with the common defense and security.

3.2 Regulatory and Rulemaking Options

The decommissioning regulations promulgated in 1988 established the current timeframe for decommissioning. As part of the current rulemaking activity, the NRC staff considered whether the decommissioning timeline should be adjusted given the advances in dismantlement and decontamination technologies since the decommissioning regulations were last updated. Based on an initial assessment of the technical bases that established the 60-year decommissioning timeframe in the 1988 rulemaking, as well as the decommissioning reactor experience and

lessons learned to date, the staff finds that power reactor decommissioning activities can be performed safely during the 60-year period.

The staff has explored incorporating additional enhancements or overall improvements to the regulatory framework based on lessons learned since the promulgation of the decommissioning regulations and consideration of whether the regulatory or technical bases for the 60-year timeframe have changed since promulgation of the 1988 decommissioning rule. The NRC considered and evaluated three options: (1) no action, (2) guidance development or enhancement, and (3) rulemaking to change the timeframe for decommissioning. Given that the NRC received no comments on the ANPR or the draft regulatory basis published for this rulemaking activity suggesting that the NRC extend the 60-year decommissioning timeline, and based on the technical considerations in the existing regulatory framework documented above, the NRC staff did not evaluate extending the decommissioning timeline beyond 60 years. A description and the NRC staff's assessment of each option follow.

3.2.1 Option 1—No Action

3.2.1.1 Description of Option 1

The no-action option would retain the provisions of the current decommissioning regulations and guidance documents with regard to the decommissioning timeframe available to licensees.

3.2.1.2 Assessment of Option 1

In determining whether the 1988 and 1996 decommissioning requirements for the 60-year timeframe for completion of decommissioning remain sufficient to address ongoing and future decommissioning activities, the NRC staff analyzed and evaluated the following:

- the technical and regulatory bases associated with both the 1988 and the 1996 decommissioning rules, as well as the associated technical documents (i.e., NUREG/CR-0130, "Technology, Safety, and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station," issued May 1978, and NUREG/CR-0672, "Technology, Safety, and Costs of Decommissioning a Reference Boiling Water Reactor Power Station," issued June 1980);

- the SOCs and public comments received for both rules; and

- comments received to date on the ANPR, draft regulatory basis, and preliminary draft regulatory analysis for this rulemaking.

Based on (1) this review and analysis, (2) feedback and lessons learned from the nuclear reactor licensees currently undergoing decommissioning, and (3) continuing oversight of the decommissioning projects occurring at various stages within the DECON and SAFSTOR timeframe, which demonstrate that these activities are being completed safely, in compliance with the NRC requirements, and in such a way that does not preclude release of the site, the NRC staff concluded that the technical and regulatory bases for the 60-year decommissioning timeframe remain valid for current decommissioning activities, and no additional safety improvements are expected from a change in the timeframe available to complete decommissioning activities.

The NRC staff did note that the overall radiological dose and waste volumes created during the immediate decommissioning process (i.e., DECON) may no longer be as high as those determined by NUREG/CR-0130 and NUREG/CR-0672 because of the use of new dismantlement and remediation technologies since the publication of those documents. However, the NRC staff also determined that these changes were not significant enough to meaningfully enhance public health and safety should the decommissioning timeframe be shortened. Furthermore, decommissioning can be and has been completed safely under the SAFSTOR and DECON process using the current regulatory timeframe. As such, maintaining the current 60-year limit for decommissioning will continue to meet the safety and regulatory requirements, will have no additional impact on future plants intending to transition to a decommissioning status, and will ensure adequate protection of public health and safety.

3.2.2 Option 2—Guidance Development or Enhancement

3.2.2.1 Description of Option 2

In this option, the NRC staff would update guidance documents to address the timeframe available to complete decommissioning activities at power reactors. Specifically, the staff would update RG 1.184, Revision 1, to include a discussion of the basis for the 60-year decommissioning timeline, including the process used to establish the initial timeframe; a discussion of why the assumptions used to support the 1988 decommissioning rule remain valid today, even considering advances in dismantlement and decontamination technologies; and a statement that the current regulatory framework maintains public health and safety. The staff would also update RG 1.185, Revision 1, and the Decommissioning GEIS as needed to include this information and provisions for adding information to the PSDAR on the decommissioning timeframe chosen and how this timeline may impact spent fuel management.

The NRC staff will update several NRC guidance documents related to the decommissioning process as part of the power reactor decommissioning rulemaking. In these updates, the NRC could include guidance for licensees on providing additional details on the licensee's chosen decommissioning timeframe. The NRC staff has needed to engage with licensees to obtain more information in this area as part of the agency's ongoing oversight of the decommissioning process, especially in regard to addressing questions and concerns from State and local government officials on the impacts of a selected decommissioning timeline on the health and safety of the public, as well as the socioeconomic consequences for communities that host a decommissioning nuclear power reactor during DECON or SAFSTOR.

Specifically, several of the comments received on the ANPR and draft regulatory basis focused on the motivation of licensees for selecting the long-term SAFSTOR option over immediate DECON and the lack of detail provided to support the timeline proposed for decommissioning and to justify why site dismantlement and decontamination at an earlier date would not be technically feasible or desirable. The comments reflected a general consensus among external, non-industry stakeholders that movement of the spent fuel into dry storage at an ISFSI as soon as technically feasible represents a safety improvement at the site.

To better inform the public and other stakeholders regarding the decommissioning process at specific facilities, the staff would update RG 1.184, Revision 1, and RG 1.185, Revision 1, to outline an acceptable level of detail in the PSDAR, DCE, and IFMP, as needed, on the timeframe proposed for decommissioning, the considerations for selecting that option, the circumstances that would prompt a change in the decommissioning timeline (i.e., movement between SAFSTOR and DECON), and the impact of that decision on long-term storage of spent

fuel. To benefit the NRC staff and stakeholders, the PSDAR, DCE, and IFMP could include additional detail on the following topics:

- the decisionmaking process behind the proposed timeline to complete decommissioning at the facility, as well as considerations for entering SAFSTOR and an overview of the conditions under which DECON will begin at the facility;

- the cost over time of the decommissioning strategy selected, specifically in regard to the delay of active dismantlement of all or parts of the facility during the SAFSTOR period;

- if available, the possibility of early release of parts of the site or facility from the NRC license so that they can be more quickly put back to beneficial use for the local community (e.g., use of warehouse space for other industrial purposes or repurposing of administrative buildings for other uses); and

- how the decommissioning timeline chosen impacts the spent fuel management plan.

3.2.2.2 Assessment of Option 2

Selection of this option would provide decommissioning licensees with guidance on adding detail in the PSDAR, DCE, or IFMP on topics already required to be covered by those decommissioning documents. This guidance would address aspects for which the NRC staff has needed to engage with licensees to obtain a more complete understanding as part of the agency's ongoing oversight of the decommissioning process, as well as topics that have concerned many stakeholders, without the need to further formalize PSDAR, DCE, or IFMP content in NRC regulations. This option would continue to provide the flexibility needed by many decommissioning sites in various stages of the process, as well as help maintain adequate protection of public health and safety throughout decommissioning. As most licensees tend to use these documents as the roadmap for assembling decommissioning documents to be submitted to the NRC, appropriate guidance updates related to the PSDAR, DCE, and IFMP could lead to an overall enhancement in the documents licensees submit to the NRC and would add transparency to the decommissioning process.

3.2.3 Option 3—Rulemaking to Alter Decommissioning Timeframe

3.2.3.1 Description of Option 3

In this option, the NRC staff would pursue rulemaking to decrease the time allowed to complete decommissioning at facilities that are not collocated with operating reactor units and establish requirements for expediting decommissioning to the extent practical at each facility. Specifically, the staff would revise 10 CFR 50.82(a)(3) and the financial regulations for decommissioning to reduce the time limit to complete decommissioning at a reactor facility once the last reactor unit has been permanently shut down, unless the licensee can demonstrate that delaying decommissioning has an overall net positive benefit to public health and safety. If this option is selected as part of the regulatory basis and proposed rule for this rulemaking, the NRC staff will conduct additional analyses of the decommissioning data provided by NUREG/CR-0130 and NUREG/CR-0672, EPRI, and other industry groups to determine the appropriate revised timeframe for completion of decommissioning.

3.2.3.2 Assessment of Option 3

Selection of this option would remove some of the flexibility envisioned by the 1988 and 1996 decommissioning rules that allow licensees to plan and conduct decommissioning over a period that was established based on (1) the time needed for the decay of several predominant radiological isotopes to reduce radiation exposures to workers, in accordance with ALARA principles, (2) the ability to effectively maintain institutional controls throughout the project, and (3) the overall costs of decommissioning as a function of time. While all of these factors may vary with time across decommissioning facilities, the NRC staff's evaluation of the continuing validity of the technical bases for the 60-year decommissioning timeframe concluded that the overall assumptions used and analyses conducted to select the 60-year time limit have not significantly changed since promulgation of the decommissioning regulations in 1988.

Finally, the associated financial requirements for decommissioning found in 10 CFR 50.75(c) are not being recommended to be changed as a part of this regulatory basis, in such a way that they would support the shortening of the allowable decommissioning timeframe, without the need for an additional backfit assessment. Appendix F to this regulatory basis discusses the financial requirements currently applicable to decommissioning power reactors, as well as the recommended changes to those requirements.

3.3 Regulatory Scope

The staff recommends no changes to the decommissioning regulations at this time.

3.4 NRC Guidance, Policy, and Implementation Issues

The NRC staff recommends revising RG 1.184, Revision 1, and RG 1.185, Revision 1, and updating NUREG-0586 as needed to reflect the changes described in Option 2 of this section. Any update to the Decommissioning GEIS would be on a schedule different from that of other guidance documents recommended to be revised as part of this decommissioning activity.

3.5 Impacts on Public Health, Safety, and Security

3.5.1 Option 1—No Action

The no-action option would retain the provisions of the current decommissioning regulations on the decommissioning timeframe available to licensees.

3.5.1.1 Impacts on Public Health, Safety, and Security

Maintaining the status quo will have no impact on public health, safety, and security because licensees have demonstrated that they can successfully decommission their facilities in compliance with the NRC requirements within 60 years.

3.5.1.2 Impacts on Licensees

Use of this option would have no impact on licensees because the level of effort and associated burdens related to decommissioning the facilities within 60 years will be unchanged.

3.5.1.3 Impacts on the NRC

Use of this option would have no impact on the NRC staff because the level of effort and associated burdens related to oversight of licensees' decommissioning their facilities within 60 years will be unchanged. Taking no action will also eliminate staff time dedicated to the rulemaking process.

3.5.1.4 Additional Considerations

Maintaining the provisions of the current decommissioning regulations regarding the timeframe available to complete decommissioning, and the flexibility for licensees to choose their own decommissioning strategy and timeline, would continue to meet the flexibility goals envisioned by the 1996 decommissioning rule, would maintain regulatory efficiency, and would have no additional impact on plants transitioning to a decommissioning status in the future.

3.5.1.5 Summary of Benefits and Costs

Maintaining the current decommissioning timeframe available to licensees, the flexibility for licensees to choose a decommissioning timeline, and the ability to alter that timeline as resources or other factors dictate, has no impact on the protection of public health and safety and no additional impact on the NRC or licensees in the decommissioning process.

3.5.2 Option 2—Guidance Development or Enhancement

Under this option, the staff would update RG 1.184, Revision 1, to include additional guidance on information that should be included in the decommissioning documents related to the discussion of the 60-year timeframe available to decommission power reactors. Before being finalized, the NRC would publish this updated guidance as draft RG 1.184, Revision 2, for public review and comment before issuing the final guidance document.

3.5.2.1 Impacts on Public Health, Safety, and Security

The guidance updates would maintain the current level of public health, safety, and security, increase the level of transparency, and promote a greater understanding by the general public and other stakeholders of the overall decommissioning process.

3.5.2.2 Impacts on Licensees

Use of this option might have a small impact on licensees who choose to increase the level of detail in their PSDAR, DCE, and IFMP. However, because the recommended updates to the guidance would reflect additional details related to information licensees are already required to submit in the PSDAR, DCE, and IFMP documents, the updates would impose minimal additional burden on the licensees that follow the guidance. In addition, currently, the NRC staff routinely asks questions about the information submitted in the PSDAR, DCE, and IFMP via RAIs, and licensees respond accordingly. These interactions increase the burden on both parties. The increased level of detail in the guidance and decommissioning submittals recommended under this option would greatly reduce or potentially eliminate the NRC staff's need to ask the licensee additional questions as part of the staff's review. Consequently, licensees would have fewer RAIs to which to respond.

3.5.2.3 Impacts on the NRC

This option would have a small impact on the NRC staff because it would require an update to RG 1.184, Revision 1, and additional staff resources would be needed to review a potentially expanded level of detail in licensees' decommissioning documents. Updates to the Decommissioning GEIS would require a larger effort by the NRC staff as discussed in Section 2.2.2 of this appendix. Although the NRC would need to expend additional resources in the near term to develop the guidance in RG 1.184 and RG 1.185, both the NRC and licensees would eventually save resources because the additional information would result in a more streamlined and predictable process that minimizes the need for additional regulatory interactions related to the PSDAR, DCE, or IFMP, and could reduce the number of stakeholder inquiries received on these documents. Further, such clarified guidance would help the NRC better plan resource needs for future decommissioning reviews. Also, this option would result in a greater level of overall regulatory transparency and openness in the NRC's decommissioning process for external stakeholders, which would offset this increased burden. Finally, this option would reduce the need of the NRC staff to have to request the submission of additional information after a licensee's PSDAR, DCE, or IFMP has been submitted.

3.5.2.4 Additional Considerations

Implementation of this option would have a relatively small impact on the NRC staff because it would require the staff to update RG 1.184, Revision 1, and RG 1.185, Revision 1. Licensees could choose to follow the guidance and increase the level of detail in the documentation that they provide in their PSDAR, DCE, or IFMP. While these changes could minimally increase the burden on licensees, they would also increase awareness of the decommissioning process among members of the public and other stakeholders, potentially reduce the need for NRC staff requests for additional information from licensees, and increase overall regulatory transparency and openness. In addition, the recommended updates would add clarity and consistency to the guidance. These recommended changes would also apply the principles of good regulation: independence, clarity, openness, reliability, and efficiency.

3.5.2.5 Summary of Benefits and Costs

Use of this option might increase the level of detail in the documentation submitted by licensees in the decommissioning process, which could lead to a better understanding of the decommissioning process by all stakeholders. This recommendation would maintain the current level of public health, safety, and security, and it would increase the level of transparency.

3.5.3 Option 3—Rulemaking to Alter Decommissioning Timeframe

In this option, the NRC staff would pursue rulemaking to decrease the time allowed to complete decommissioning at facilities that are not collocated with operating reactor units and establish requirements for expediting decommissioning to the extent practical at each facility. Specifically, the staff would revise 10 CFR 50.82(a)(3) and the financial regulations associated with decommissioning to reduce the time limit to complete decommissioning at a reactor facility once the last reactor unit has been permanently shut down, unless the licensee demonstrates that delaying decommissioning has an net positive benefit to public health and safety.

3.5.3.1 Impacts on Public Health, Safety, and Security

The NRC staff found that shortening the 60-year timeframe available to decommission a nuclear power plant would not increase the protection of the public health and safety or enhance the common defense and security. Even though the use of new dismantlement and remediation technologies can reduce the overall radiological dose to workers and the volumes of waste created during DECON, the NRC staff determined that these changes were not significant enough to meaningfully enhance public health, safety, or security should the decommissioning timeframe be shortened. In addition, the NRC has concluded, in numerous spent fuel and waste confidence studies (see Section 2.2, "Power Reactor Decommissioning Activity Since the 1996 Decommissioning Rule," of this regulatory basis), that spent fuel storage in dry or wet conditions is protective of public health and safety and the environment, such that shortening the timeframe available for decommissioning, which has also been shown to be able to be completed safely within 60 years, would not meaningfully enhance public health and safety.

3.5.3.2 Impacts on Licensees

Use of this option would have a high impact on licensees because of the level of effort and associated burdens related to preparation and submittal of more detailed decommissioning documents to the NRC, response to any additional requests for information from the NRC and other stakeholders, and the potential need to modify the decommissioning funding mechanisms to accommodate a decommissioning timeframe that is shorter than that originally planned for at the outset of operations. For licensees, the changes would decrease their flexibility in conducting decommissioning activities, thereby decreasing efficiency and potentially leading to the need to restructure planned decommissioning activities.

3.5.3.3 Impacts on the NRC

Use of this option would have a high impact on the NRC. It would require the NRC to:

- promulgate new rule language for the imposition of regulations that differ significantly from the goals of the 1996 decommissioning rule and the objectives of this rulemaking;
- develop a regulatory and technical basis in support of conclusions that diverge from the current decommissioning process;
- create a new regulatory framework for completion of decommissioning on a shorter timeframe than currently established; and
- conduct an assessment of whether imposing the new rule would constitute backfitting under 10 CFR 50.109 or violate issue finality under 10 CFR Part 52.

3.5.3.4 Additional Considerations

Selection of this option would require both operating and decommissioning licensees to expend time and effort to alter their planned decommissioning timeframes in accordance with a new rule and find the resources to complete decommissioning in an expedited manner. While these changes would have no direct positive impact on public health and safety, they would decrease licensees' flexibility to conduct decommissioning activities, thereby decreasing efficiency.

3.5.3.5 Summary of Benefits and Costs

Changing the current regulatory framework regarding the 60-year timeframe for decommissioning would have a high impact on both licensees and the NRC without a corresponding increase in the level of protection of public health and safety.

3.6 Backfitting and Issue Finality Considerations

Option 1 would maintain the status quo of the current decommissioning regulations on the decommissioning timeframe available to licensees. Option 2 would update guidance, but not require its use, for providing an additional level of detail in the decommissioning documents on topics already required to be covered by the PSDAR, DCE, and IFMP for issues that have concerned many stakeholders. Further formalization of the content of these documents in NRC regulations would not be necessary. These changes would not constitute backfitting as defined in 10 CFR 50.109 or a violation of issue finality under 10 CFR Part 52. Option 3 would implement new requirements related to the allowable timeline to complete decommissioning, which could constitute a backfit under 10 CFR 50.109 or a violation of issue finality under 10 CFR Part 52. Selection of Option 3 would require the NRC staff to conduct a backfit assessment to determine the consequences of imposing such a rule.

3.7 Stakeholder Feedback on Draft Regulatory Basis

3.7.1 Feedback from Rulemaking Public Meetings

The NRC held two public meetings, one on December 9, 2015, to discuss the ANPR, and another on May 8–10, 2017, to discuss the draft regulatory basis and preliminary draft regulatory analysis for a future rulemaking on decommissioning commercial nuclear power plants. During these meetings, the NRC staff received feedback on the timeframe associated with the decommissioning process. Many of these commenters focused on the motivation of licensees for selecting the SAFSTOR option over immediate DECON and the lack of detail provided to support the timeline proposed for decommissioning and to justify why site dismantlement and decontamination at an earlier date are not technically feasible or desirable. The general consensus among external, non-industry stakeholders was that movement of spent fuel into dry storage at an ISFSI as soon as technically feasible represents a safety improvement at the site. Many comments supported the removal of SAFSTOR as a decommissioning option and a requirement that all decommissioning activities be completed within 10 years of the last reactor shutdown at the site. The NRC staff considered these observations in preparing its recommendations in this appendix.

3.7.2 Main Themes from Public Comment Submissions

During the public comment period for the draft regulatory basis, as part of the more than 40 submissions received, the NRC received roughly 25 comment submissions directly related to Appendix H. Some commenters stated that the 60-year timeframe for decommissioning should not be changed because all decommissioning and license termination activities to date have been completed safely within this period, have had adequate funding as assured by the decommissioning trust funds, and remained protective of public health and safety. In addition, these commenters noted that any change to the allowable decommissioning timeframe would remove much of the flexibility envisioned by the 1996 decommissioning rule in regard to licensees being able to choose a decommissioning strategy and timeframe that optimize the resources of the licensee, facility, and waste disposal capability.

Other commenters recommended that the SAFSTOR decommissioning option be removed, stating that the 60-year limit for decommissioning is too long and results in extended socioeconomic impacts to the surrounding community throughout this period. These comments also reiterated that "the forced dormancy of resources, especially when said action poses a potential threat to the community in the form of radiological and nonradiological hazardous contamination" is unacceptable and that a process for the prompt decommissioning and return of the site to unrestricted use is the most desirable outcome for the host community. Some comments focused on the end state of the decommissioning site at the time of license termination. These comments recommended prompt decommissioning, decontamination, and return of property to unrestricted use.

3.7.3 NRC Response to Comments

In response to the comments received on the draft regulatory basis, the NRC staff has modified its plans to revise RG 1.184, Revision 1, to reflect more fully the type of information the NRC would be seeking in the decommissioning documents as part of the recommended guidance updates. The changes would also remove from consideration the addition of information to the guidance that is outside the scope of the current rulemaking activity or not appropriate to address in the early phases of decommissioning as described in the PSDAR. In addition, to address the comments related to the end state of the site, the NRC staff is proposing to add more detail to the decommissioning documents on the potential future uses of the site and the overall plan for final disposition of the structures and other components at the facility (i.e., will parts of the site be released early in accordance with 10 CFR 50.83, will the site be made available for industrial use, will the buildings and other structures be left in place, or will the site become a "green field"), as well as the associated timelines.

3.8 NRC Staff Recommended Approach

The NRC staff has determined that no public health or safety improvements would be gained by regulatory changes to the decommissioning timeframe. The NRC staff based this finding on an initial inspection of the 1988 and 1996 SOCs, lessons learned, stakeholder comments on the ANPR and draft regulatory basis published for this rulemaking activity, and other technical data that informed previous decommissioning rulemaking activities about the 60-year timeframe to complete decommissioning, as well as an assessment of the ongoing decommissioning activities. Therefore, given the NRC's desire to maintain safety and improve efficiency and effectiveness in the regulatory process for decommissioning nuclear power plants, the NRC staff recommends Option 2 (Guidance Development or Enhancement).

Use of this option would give the NRC staff and other stakeholders access to more detailed information in the PSDAR, DCE, and IFMP for those licensees choosing to implement the enhanced guidance. Option 2 would not reduce the flexibility provided by the current decommissioning regulations in regard to choosing a decommissioning timeframe or impose unnecessary burdens on licensees and NRC staff to change the requirements for the timeline for decommissioning, or create and review additional documents that do not have a net positive impact on public health and safety. Because these guidance updates would reflect additional information on topics already required to be covered in the decommissioning documents, they would not impose a substantial additional burden on the licensee.

4 MAINTAINING THE DECOMMISSIONING OPTIONS

4.1 Existing Regulatory Framework

Licensees currently have three options for decommissioning power reactor facilities, although the options are not required or codified by regulation. These options, first identified in the 1988 Decommissioning GEIS, are defined as follows:

- DECON: The equipment, structures, and portions of the facility and site that contain radioactive contaminants are promptly removed or decontaminated to a level that permits termination of the license shortly after cessation of operations.

- SAFSTOR: The facility is placed in a safe, stable condition and maintained in that state (safe storage) until it is subsequently decontaminated and dismantled to levels that permit license termination. During SAFSTOR, a facility is left intact, but the fuel has been removed from the reactor vessel, and radioactive liquids have been drained from systems and components and then processed. Radioactive decay occurs during the SAFSTOR period, thus reducing the quantity of contaminated and radioactive material that must be disposed of during decontamination and dismantlement. The definition of SAFSTOR also includes the decontamination and dismantlement of the facility at the end of the storage period.

- ENTOMB: Radioactive systems, structures, and components are encased in a structurally long-lived substance, such as concrete. The entombed structure is appropriately maintained and kept under continued surveillance until the radioactivity decays to a level that permits termination of the license.

  The NRC staff position is that entombment should be used as a last resort for the decommissioning of power reactor facilities, with the expectation that this method would be selected only under unique decommissioning circumstances. The International Atomic Energy Agency (IAEA) has circulated a similar view for comment (see IAEA Nuclear Energy Series No. NW-G-2.1, “Policies and Strategies for the Decommissioning of Nuclear and Radiological Facilities”). Entombment should be used only if this option provides more benefit than harm to public health and safety and the environment and does not create a legacy situation to be managed by future generations.

The choice of the decommissioning method is left to the licensee, provided that the method can be performed in accordance with the NRC’s regulations. As described in the Decommissioning GEIS, the NRC requires the licensee to reevaluate its selection of the decommissioning method if the method (1) cannot be completed as described, (2) cannot be completed within 60 years of the permanent cessation of plant operations, (3) includes activities that would endanger the health and safety of the public by being outside of the NRC’s health and safety regulations, or (4) would result in a significant impact to the environment. The licensee communicates its choice of decommissioning method to the NRC and the public in the PSDAR. To date, all NRC licensees that are decommissioning or have decommissioned commercial nuclear power plants have used either DECON or SAFSTOR. Several sites have performed some incremental decontamination and dismantlement during the storage period of SAFSTOR—a combination of SAFSTOR and DECON—as personnel, money, or other factors dictate.

4.2 Regulatory and Rulemaking Options

Guidance documents such as the Decommissioning GEIS and RG 1.184, Revision 1, discuss the current methods available for decommissioning. As part of this rulemaking activity, the NRC staff considered whether these options should be explicitly addressed and defined in the NRC's regulations instead of solely in guidance and environmental documents. Given the advances in dismantlement and decontamination technologies since the agency last updated the decommissioning regulations, the NRC staff also explored whether other options for decommissioning should be considered. In general, the selection of a decommissioning option depends primarily on which method is most useful for the facility, given the timeframes associated with the different approaches. In accordance with the existing regulations, the licensee's decommissioning approach and timeline are independent decisions, as long as decommissioning can be completed within the 60-year period required by 10 CFR 50.82(a)(3).

Based on an initial assessment of DECON and SAFSTOR (which are basically "decommission now" or "decommission later" philosophies), as well as the fact that no U.S. commercial nuclear power plant licensed by the NRC has requested or used the ENTOMB option, no regulatory improvements or significant increases to public health and safety appear to be gained by codifying the decommissioning options. However, the NRC staff considered whether the technical bases for any of the decommissioning methods have changed since the promulgation of the 1996 decommissioning rule and the 2002 update to the Decommissioning GEIS, and explored the opportunity to enhance or improve the regulatory framework based on lessons learned since that time. The NRC considered and evaluated three options: (1) no action, (2) guidance development or enhancement, and (3) rulemaking to codify the approaches for decommissioning. A description and the NRC staff's assessment of each option follow.

4.2.1 Option 1—No Action

4.2.1.1 Description of Option 1

The no-action option would retain the provisions of the current decommissioning regulations and guidance documents with regard to the decommissioning methods available to licensees, the flexibility for licensees to choose a decommissioning option and its timeline, and the ability to move between SAFSTOR and DECON as resources or other factors dictate. These provisions apply as long as license termination is accomplished within the 60-year period (unless the NRC explicitly approves an alternative schedule).

4.2.1.2 Assessment of Option 1

Because licensees have demonstrated that they can decommission their facilities in compliance with the NRC requirements using the DECON and SAFSTOR methods described in NRC guidance, the NRC does not expect additional public health and safety improvements will be gained by codifying SAFSTOR and DECON in the decommissioning regulations. Therefore, codifying these methods in the regulations would have no practical benefit for public health and safety. In addition, maintaining the status quo will have no additional impact on future plants as they transition to a decommissioning status. The continued use of guidance documents to discuss the decommissioning options is an adequate forum to aid licensees in formulating a decommissioning strategy because it maintains the flexibility envisioned by the 1996 decommissioning rule, allows licensees to govern their own decommissioning approach and timeframe, and is protective of public health and safety.

4.2.2 Option 2—Guidance Development or Enhancement

4.2.2.1 Description of Option 2

In this option, the NRC staff would update guidance documents to address the various methods to decommission power reactors. Specifically, the staff would update RG 1.184, Revision 1, to include additional discussion of SAFSTOR and DECON, as well as enhance the guidance on the potential merits and disadvantages of entering into long-term SAFSTOR versus pursuing immediate DECON. In addition, the staff would remove the discussion of the ENTOMB option from the existing guidance documents for power reactor decommissioning to the extent practical as this method is not realistically feasible for current U.S. power reactors, and the timeframe for decommissioning completion using the ENTOMB method is generally inconsistent with the current regulations. To reflect this information, the staff would also update RG 1.185, Revision 1, and the Decommissioning GEIS to include provisions for including additional information on the chosen decommissioning strategy in the PSDAR.

The NRC staff will update several NRC guidance documents related to the decommissioning process as part of the power reactor decommissioning rulemaking. In these updates, the NRC could include guidance for licensees on providing additional details on the licensee's chosen decommissioning option. The NRC staff has needed to engage with licensees to obtain more information in this area as part of the agency's ongoing oversight of the decommissioning process, especially in regard to addressing questions and concerns from State and local government officials on the impacts of a selected decommissioning method on the health and safety of the public, as well as the socioeconomic consequences for communities that host a decommissioning nuclear power reactor during DECON or SAFSTOR.

These updates would also address concerns identified by stakeholders regarding the options available for decommissioning. Specifically, several of the comments received on the ANPR and draft regulatory basis published for this rulemaking activity focused on the motivation of licensees for selecting the long-term SAFSTOR option; the lack of detail provided by licensees to support certain decisions on the option and timeframe selected for decommissioning; and a general consensus among external, non-industry stakeholders that movement of the spent fuel into dry storage at an ISFSI as soon as technically feasible represents a safety improvement at the site. To better inform the public and other stakeholders about the decommissioning process at specific facilities, the NRC staff would update RG 1.184, Revision 1, and RG 1.185, Revision 1, to add to the guidance details that should be included in the PSDAR, DCE, or IFMP, or a combination of these, about the option selected for decommissioning, the reasons for selecting that option, and the impact of that decision on long-term storage of spent fuel.

To benefit the NRC staff and stakeholders, licensees could include additional detail in the PSDAR, DCE, and IFMP on the following topics:

- the decisionmaking process behind the selection of SAFSTOR or DECON as the decommissioning method and the associated timeline, as well as an overview of the conditions under which DECON will begin at the facility;

- for the DECON method, how the facility would optimize worker safety, institutional knowledge, and cost, while minimizing the offsite migration of contamination; and

- if known, the potential future uses of the site and the overall plan for final disposition of the structures and other components at the facility (i.e., will parts of the site be released

early in accordance with 10 CFR 50.83, will the site be made available for industrial use, will the buildings and other structures be left in place, or will the site become a "green field"), as well as the associated timelines.

As previously noted, the NRC's updates of the existing guidance would remove ENTOMB as an option because it is not feasible for U.S. nuclear power reactors and is not consistent with the required timeframe to complete decommissioning. The removal of the ENTOMB option is consistent with previous discussions between the NRC, internal and external stakeholders, and members of the international regulatory community. In general, while all these parties recognize entombment, they also know that its application is limited to special situations; thus, it may not be appropriate to maintain it as a prescribed strategy within the typical regulatory framework. To that end, the IAEA is revising its decommissioning safety position, wherein entombment would no longer be considered as desirable as immediate and deferred dismantlement (i.e., DECON and SAFSTOR). The revised IAEA safety position would recognize that entombment is not a "strategy" or a solution for normal planned shutdown, but should be considered a solution only under exceptional circumstances (such as severe accidents) for existing facilities and would be considered on a case-by-case basis.

4.2.2.2 Assessment of Option 2

Selection of this option would provide decommissioning licensees with guidance on adding detail in the PSDAR, DCE, or IFMP, or a combination thereof, on topics already required to be covered in those decommissioning documents. This guidance would address topics for which the NRC staff has historically requested additional information from licensees, as well as topics that have concerned many stakeholders. This option would continue to provide the flexibility needed by many decommissioning sites in various stages of the process, as well as help maintain adequate protection of public health and safety throughout decommissioning. Because most licensees tend to use the NRC guidance documents as the roadmap for assembling decommissioning documents to be submitted to the NRC, appropriate guidance updates related to the PSDAR, DCE, and IFMP could lead to an overall enhancement in the decommissioning documents licensees submit to the NRC.

4.2.3 Option 3—Rulemaking to Codify Decommissioning Options

4.2.3.1 Description of Option 3

In this option, the NRC staff would pursue rulemaking to codify in 10 CFR 50.82 the methods available for decommissioning and establish requirements for each option. Specifically, these additional regulations would outline the types of activities that may be undertaken under both DECON and SAFSTOR, as well as the associated timelines and expectations for switching between the two methods. In addition, licensees would be required to inform the NRC of which decommissioning method they intend to use and provide additional notice if they change the selection as decommissioning progresses.

4.2.3.2 Assessment of Option 3

Selection of this option would remove some of the flexibility envisioned by the 1996 decommissioning rule that allows for licensees to move between the "dismantle and decontaminate now" and "dismantle and decontaminate later" options that are the basis of DECON and SAFSTOR, respectively. Movement between the two methods is usually based on resource considerations, including the availability of decontamination and dismantlement

equipment and personnel, waste disposal transportation agreements and disposal facility capacity, and the appropriate use of decommissioning funds. Transitioning between the two methods allows licensees to optimize their approach to decommissioning depending on site-specific considerations, including input from the State and local community.

Based on lessons learned and experiences from previously decommissioned reactors, there is currently no indication that the use of guidance documents to describe DECON and SAFSTOR as decommissioning methods, or the ability to switch between the two, has any substantial impact on public health and safety, or in any way diminishes the planning, preparation, and oversight conducted by the licensee or the NRC in decommissioning activities. Therefore, use of a more formal structure (i.e., regulations) to define various decommissioning methods would remove some of the flexibility envisioned by the 1996 decommissioning rule with no corresponding change in the protection of public health and safety.

4.3 Regulatory Scope

The NRC staff recommends no changes to the decommissioning regulations at this time.

4.4 NRC Guidance, Policy, and Implementation Issues

Under Option 2 of this section, the NRC staff would revise RG 1.184, Revision 1, and RG 1.185, Revision 1, and update NUREG-0586 as needed to reflect the changes described in Option 2. Any update to the Decommissioning GEIS would be on a different schedule than that of other guidance documents recommended to be revised as part of this decommissioning activity.

4.5 Impacts on Public Health, Safety, and Security

4.5.1 Option 1—No Action

The no-action option would retain the provisions of the current decommissioning regulations and guidance documents regarding the decommissioning methods available to licensees, the flexibility for licensees to choose a decommissioning option and its timeline, and the ability to move between SAFSTOR and DECON as resources or other factors dictate. These provisions apply as long as license termination is accomplished within the 60-year period.

4.5.1.1 Impacts on Public Health, Safety, and Security

Maintaining the status quo will have no impact on public health, safety, and security because licensees have demonstrated that they can decommission their facilities in compliance with the NRC requirements using the DECON and SAFSTOR methods described in NRC guidance.

4.5.1.2 Impacts on Licensees

Use of this option would have no impact on licensees because the level of effort and associated burdens related to decommission their facilities using the DECON and SAFSTOR methods described in NRC guidance will be unchanged.

4.5.1.3 Impacts on the NRC

Use of this option would have no impact the NRC staff because the level of effort and associated burdens related to oversight of licensees' decommissioning their facilities using the DECON and SAFSTOR methods described in NRC guidance will be unchanged. Taking no action will also eliminate staff time dedicated to the rulemaking process.

4.5.1.4 Additional Considerations

Maintaining the provisions of the current decommissioning regulations and guidance documents regarding the decommissioning methods, and the flexibility for licensees to choose between decommissioning strategies and timelines, would continue to meet the flexibility goals envisioned by the 1996 decommissioning rule, would maintain regulatory efficiency, and would have no additional impact on plants transitioning to a decommissioning status in the future.

4.5.1.5 Summary of Benefits and Costs

Maintaining the current decommissioning methods available to licensees, the flexibility for licensees to choose a decommissioning option and its timeline, and the ability to move between methods as resources or other factors dictate, has no impact on the protection of public health and safety and no additional impact on the NRC or licensees in the decommissioning process.

4.5.2 Option 2—Guidance Development or Enhancement

Under this option, the NRC staff would update RG 1.184, Revision 1, to include additional guidance on information that should be included in the PSDAR related to the discussion of SAFSTOR and DECON. This updated guidance would also offer enhanced guidance to licensees regarding the potential merits and disadvantages of entering into long-term SAFSTOR versus pursuing immediate DECON of at least certain systems and components at the facility. In addition, the staff would remove discussion of the ENTOMB option from the existing guidance documents to the extent practical as this method is not feasible for current U.S. power reactors. Before finalizing the guidance, the NRC would publish this updated guidance as draft RG 1.184, Revision 2, for public review and comment.

4.5.2.1 Impacts on Public Health, Safety, and Security

The guidance updates would maintain the current level of public health, safety, and security, increase the level of transparency, and promote a greater understanding among the general public and other stakeholders of the overall decommissioning process.

4.5.2.2 Impacts on Licensees

Use of this option could have a small impact on licensees that choose to implement the updated guidance because they each would provide an increased level of detail in their PSDAR, DCE, and IFMP. However, because the recommended updates to the guidance would reflect additional details related to information licensees are already required to submit in the PSDAR, DCE, and IFMP documents, the updated guidance would impose a minimal additional burden on the licensees that choose to follow the guidance. In addition, currently, the NRC staff routinely asks questions about the information submitted in the PSDAR, DCE, and IFMP via RAIs, and licensees respond accordingly. These interactions increase the burden on both parties. The increased level of detail in the guidance and decommissioning submittals

recommended under this option would greatly reduce or potentially eliminate the NRC staff's need to ask the licensee additional questions as part of the staff's review. Consequently, licensees would have fewer RAIs to which to respond.

4.5.2.3 Impacts on the NRC

This option would have a have a small impact on the NRC staff because it would require an update to RG 1.184 and RG 1.185 and additional staff resources would be needed to review a potentially expanded level of detail in licensees' decommissioning documents. Updates to the Decommissioning GEIS would require a larger effort by the NRC staff as discussed in Section 2.2.2 of this appendix. Although the NRC would need to expend additional resources in the near term to develop the guidance in RG 1.184 and RG 1.185, both the NRC and licensees would eventually save resources because the additional information provided would result in a more streamlined and predictable process that minimizes the need for additional regulatory interactions related to the PSDAR, DCE, or IFMP, and could reduce the number of stakeholder inquiries received on these documents. Further, such clarified guidance would help the NRC better plan resource needs for future decommissioning reviews. Also, this option would result in a greater level of overall regulatory transparency and openness in the NRC's decommissioning process for external stakeholders, which would offset this increased burden. Finally, this option would reduce the need of the NRC staff to have to request the submission of additional information after a licensee's PSDAR, DCE, or IFMP has been submitted.

4.5.2.4 Additional Considerations

Implementation of this option would have a relatively small impact on the NRC staff because it would require the staff to update RG 1.184, Revision 1, and RG 1.185, Revision 1. Licensees could choose to follow the guidance and increase the level of detail in the documentation that they provide in their PSDAR, DCE, or IFMP. While these changes would minimally increase the burden on licensees, they would also increase awareness of the decommissioning process among the members of the public and other stakeholders, potentially reduce the need for NRC staff requests for additional information from licensees, and increase overall regulatory transparency and openness. In addition, the recommended updates would add clarity and consistency to the guidance. These recommended changes would also apply the principles of good regulation: independence, clarity, openness, reliability, and efficiency.

4.5.2.5 Summary of Benefits and Costs

Use of this option might increase the level of detail in the documentation submitted by licensees in the decommissioning process, which could lead to a better understanding of the decommissioning process by all stakeholders. This recommendation would maintain the current level of public health, safety, and security, and it would increase the level of transparency.

4.5.3 Option 3—Rulemaking to Codify Decommissioning Options

In this option, the NRC staff would pursue rulemaking to codify in 10 CFR 50.82 the methods available for decommissioning and establish requirements for each option. Specifically, these additional regulations would outline the types of activities that may be undertaken under both DECON and SAFSTOR, as well as the associated timelines and expectations for switching between the two methods. In addition, licensees would be required to inform the NRC of the decommissioning method they intend to use and provide additional notice if they changed that selection as decommissioning progresses.

4.5.3.1 Impacts on Public Health, Safety, and Security

There is no indication that codifying the decommissioning methods or decreasing the flexibility available to licensees to switch between DECON and SAFSTOR as decommissioning progresses would increase the protection of the public health and safety or enhance the common defense and security.

4.5.3.2 Impacts on Licensees

Use of this option would have a high impact on licensees because of the level of effort and associated burdens related to preparation and submittal of more detailed decommissioning documents to the NRC, response to any additional requests for information from the NRC and other stakeholders, the need to inform the NRC whenever decommissioning methods are changed, and the potential need for license amendments and opportunities for hearing on license amendments. For licensees, the changes would decrease their flexibility in conducting decommissioning activities, thereby decreasing efficiency and potentially delaying decommissioning activities while the regulatory process is completed.

4.5.3.3 Impacts on the NRC

Use of this option would have a high impact on the NRC. It would require the NRC to:

- promulgate new rule language for the imposition of regulations that differ significantly from the goals of the 1996 decommissioning rule and the objectives of this rulemaking;
- develop a regulatory and technical basis in support of conclusions that diverge from the current decommissioning process;
- incorporate requirements associated with decommissioning options through numerous review and oversight activities associated with the decommissioning process; and
- conduct an assessment of whether imposing the new rule would constitute backfitting under 10 CFR 50.109 or violate issue finality under 10 CFR Part 52.

4.5.3.4 Additional Considerations

Selection of this option would remove some of the flexibility envisioned by the 1996 decommissioning rule that allows for licensees to move between the DECON and SAFSTOR. Movement between the two methods is usually based on resource considerations, and transitioning between the two methods allows licensees to optimize their approach to decommissioning depending on site-specific considerations.

4.5.3.5 Summary of Benefits and Costs

Moving the current discussion of decommissioning options in guidance documents to regulations would have a high impact on both licensees and the NRC without a corresponding increase in the level of protection of public health and safety.

4.6 Backfitting and Issue Finality Considerations

Option 1 would maintain the status quo of the current decommissioning regulations' and guidance documents' coverage of the decommissioning methods available to licensees, the flexibility for licensees to choose the decommissioning option they wish to implement, and the ability to move between SAFSTOR and DECON as resources or other factors dictate. These provisions apply as long as license termination is accomplished within the 60-year period. Option 2 would establish guidance, but not require its use, for providing an additional level of detail in the decommissioning documents on topics already required to be covered by the PSDAR, DCE, or IFMP for issues that have concerned many stakeholders. Further formalization of the content of these documents in NRC regulations would not be necessary. Option 3 would implement new decommissioning requirements related to the contents of the PSDAR, DCE, and IFMP that could constitute a backfit under 10 CFR 50.109 or a violation of issue finality under 10 CFR Part 52. Selection of this option would require the NRC staff to conduct a backfit assessment to determine the consequences of imposing such a rule.

4.7 Stakeholder Feedback on Draft Regulatory Basis

4.7.1 Feedback from Rulemaking Public Meetings

The NRC held two public meetings, one on December 9, 2015, to discuss the ANPR, and another on May 8–10, 2017, to discuss the draft regulatory basis and preliminary draft regulatory analysis for a future rulemaking on decommissioning commercial nuclear power plants. During these meetings, the NRC staff received feedback regarding the options available for decommissioning facilities and the timeframes associated with those options. Many meeting participants, while not commenting specifically on the SAFSTOR or DECON decommissioning methods, asked that the NRC require removal or transfer of fuel from spent fuel pools (SFPs) to dry cask storage as soon as technically possible. In addition, many comments supported removal of ENTOMB as a decommissioning option, except in cases of severe accidents where additional, specialized regulatory interactions would be required, but noted that expending resources to remove this option from the decommissioning guidance documents may not be the most efficient use of NRC staff time. The NRC staff considered these observations in preparing its recommendations in this appendix.

4.7.2 Main Themes from Public Comment Submissions

During the public comment period for the draft regulatory basis, as part of the more than 40 submissions received, the NRC received roughly 25 comment submissions directly related to Appendix H. Some comments stated that the methods available for decommissioning should not be codified in the regulations to maintain regulatory flexibility and that explicit removal of the ENTOMB option from the decommissioning guidance documents was not the most efficient use of NRC staff resources because this option would involve extensive regulatory interaction were it ever to be used during decommissioning.

Other commenters recommended that both the SAFSTOR and ENTOMB decommissioning options be removed, stating that the length of decommissioning is critical to the local community and the State, and that the States see prompt, immediate decommissioning as the best method in avoiding the prolonged risks to human health, the environment, and the local economy posed by a lengthy decommissioning process. These comments also reiterated that the decommissioning timeline, including the decision to stop operations of a nuclear plant, needs to align with socioeconomic planning processes at the State level.

Other comments focused on the future end use of the decommissioning site, noting that multiple entities rely on the clarity and transparency of NRC decommissioning requirements. These commenters requested additional details about decommissioning requirements and the timeline of the decommissioning process, especially when the associated property can be considered for redevelopment. The commenters stated that such details would help communities mitigate the adverse economic impacts of nuclear power reactor closures.

4.7.3 NRC Response to Comments

In response to the comments received on the draft regulatory basis, the NRC staff has modified parts of the recommended changes to RG 1.184, Revision 1, to reflect more fully the type of information the NRC is seeking in the decommissioning documents. Specifically, RG 1.184, Revision 1, would no longer recommend that licensees include a discussion of the socioeconomic impacts of decommissioning in the decommissioning documents because this is already addressed in the Decommissioning GEIS. In response to comments, the NRC is also removing its recommendation to include in guidance areas that are outside the scope of the current rulemaking activity or not appropriate to address in the early phases of decommissioning described in the PSDAR. As part of these changes, the NRC staff removed the proposal to include in guidance a discussion of the cost over time of the decommissioning method selected, specifically in regard to the potential escalation of dismantlement costs and waste disposal fees, as these topics are covered elsewhere in the decommissioning process.

In addition, to address the comments related to future use of the site, the NRC staff is proposing to add details to the guidance that licensees could include in the decommissioning documents. These details concern the potential future uses of the site and the overall plan for final disposition of the structures and other components at the facility (i.e., will parts of the site be released early in accordance with 10 CFR 50.83, will the site be made available for industrial use, will the buildings and other structures be left in place, or will the site become a “green field”), as well as the associated timelines.

4.8 NRC Staff Recommended Approach

The NRC staff has determined that no additional public health or safety improvements would be gained by changes to the NRC regulatory framework in this area. The NRC staff based this finding on an initial inspection of the 1988 and 1996 SOCs, lessons learned, stakeholder comments on the ANPR and draft regulatory basis published for this rulemaking activity, and other data that informed previous decommissioning rulemaking activities, as well as an assessment of the ongoing decommissioning activities now taking place under the current requirements. Therefore, given the NRC’s desire to maintain safety and improve efficiency, effectiveness, and transparency in the regulatory process for decommissioning nuclear power plants, the NRC staff recommends Option 2 (Guidance Development or Enhancement). Use of this option would give the NRC staff and other stakeholders access to more detailed information in the PSDAR, DCE, and IFMP for those licensees choosing to implement the enhanced guidance. Option 2 would not reduce the flexibility allowed by the current decommissioning regulations in regard to choosing a decommissioning strategy or impose unnecessary burdens on licensees and NRC staff to create and review additional documents that do not have a net positive impact on public health and safety. Because these guidance updates would reflect additional information on topics already required to be covered in the decommissioning documents, they would not impose a substantial additional burden on the licensee.

5 ROLE OF EXTERNAL STAKEHOLDERS IN DECOMMISSIONING

5.1 Existing Regulatory Framework

Although the NRC does not have the authority to direct governmental and nongovernmental entities (other than NRC licensees) to participate in the decommissioning of a facility, NRC regulations currently offer the public an opportunity to review licensee submittals and provide input during many stages of the decommissioning process. Specifically, 10 CFR 50.82(a)(4) and 10 CFR 50.82(a)(9) require the NRC to publish a notice of the receipt of the licensee's PSDAR and LTP, make the PSDAR and LTP available for public comment, schedule public meetings in the vicinity of the licensed facility to discuss the PSDAR and the LTP, and publish a notice of the meetings in the *Federal Register* and another forum readily accessible to individuals in the vicinity of the site. Further, in accordance with 10 CFR 50.82(a)(7), "in taking actions permitted under § 50.59 following submittal of the PSDAR, the licensee shall notify the NRC, in writing and send a copy to the affected State(s), before performing any decommissioning activity inconsistent with, or making any significant schedule change from, those actions and schedules described in the PSDAR, including changes that significantly increase the decommissioning cost." The NRC staff also routinely engages with State and local government stakeholders by participating, as requested, in meetings or through other interactions with these governmental bodies (e.g., the public utility commission, the coastal commission, environmental and radiological control boards).

In addition, for many years, the NRC has strongly recommended that licensees involved in decommissioning activities form a community committee or other advisory organization aimed at fostering communication and information exchange between the licensee and the members of the community that decommissioning affects. By actively engaging the community and obtaining local citizen views and concerns regarding the decommissioning process and spent fuel storage issues, licensees can better understand and consider these views , maintain better relations with the local citizens, and local communities can be kept informed of the licensee's decommissioning activities. In NUREG-1757, Appendix M, "Overview of the Restricted Use and Alternate Criteria Provisions of 10 CFR Part 20, Subpart E" (ADAMS Accession No. ML063000243), the NRC provides guidance on creating a site-specific community advisory board. Appendix M does not require licensees to create a community advisory board; instead, it provides recommendations for methods of soliciting public advice and useful guidance and suggestions for effective public involvement in the decommissioning process that any licensee can adopt. Although not a regulatory requirement, all decommissioning licensees to date have created some form of community advisory board with membership and activity levels commensurate with the overall level of interest in the decommissioning activities at the facility.

5.2 Regulatory and Rulemaking Options

Based on an evaluation of the authority given to the NRC by the AEA, the NRC has no basis to mandate participation in the decommissioning process by any non-licensee stakeholders. Such interactions are determined on a case-by-case basis among the licensee and other stakeholders as necessary to address the specific decommissioning situation at each facility. However, the NRC staff did explore the opportunity to incorporate additional enhancements or overall improvements to the role of State and local governments, members of the public, and other external stakeholders in the decommissioning process. The NRC considered and evaluated three options: (1) no action, (2) guidance development or enhancement, and

(3) rulemaking to mandate the creation of a community advisory board. A description and the NRC staff's assessment of each option follow.

5.2.1 Option 1—No Action

5.2.1.1 Description of Option 1

The no-action option would retain the provisions of the current decommissioning regulations and guidance documents with regard to external stakeholder involvement in the decommissioning process and the role of State and local government entities in decommissioning decisions. Licensees would maintain a similar level of regulatory involvement with their individual States as was present when their facilities were operating (e.g., continued compliance with State environmental requirements for nonradiological effluent releases, interactions with the State radiological control board on decommissioning issues and site remediation plans).

5.2.1.2 Assessment of Option 1

During decommissioning, the NRC invites members of the public, State and local government, and other stakeholders to be involved in the decommissioning process. The NRC does not currently require that licensees involve the public and State and local governments in their decommissioning activities. Nonetheless, openness is among the NRC's organizational values and principles of good regulation, and the NRC's general policy is to share information with the public in a transparent manner whenever possible. For this reason, the NRC would continue to communicate the value of creating some form of community advisory board or outreach organization at decommissioning facilities. The continued use of guidance documents to discuss best practices for establishing community advisory boards is an adequate forum to aid licensees in formulating an overall decommissioning strategy with regard to stakeholder participation. In addition, all current decommissioning facilities have already established community advisory boards to some degree.

5.2.2 Option 2—Guidance Development or Enhancement

5.2.2.1 Description of Option 2

In this option, the NRC staff would update guidance documents to expressly address the creation of community advisory boards at decommissioning power reactors. Specifically, the NRC would update RG 1.184, Revision 1, and RG 1.185, Revision 1, to discuss best practices for creating a community advisory board at decommissioning facilities, including best practices for membership, the anticipated level of community advisory board activity and involvement in the decommissioning process, and ways in which to leverage the board to assist in making decommissioning decisions, if licensees chose to create a community advisory board.

The NRC will update several of its guidance documents related to the decommissioning process as part of the power reactor decommissioning rulemaking. As part of these guidance updates, the NRC could update its guidance to provide additional details on aspects for which the NRC staff has needed to engage with licensees to obtain a more complete understanding as part of the agency's ongoing oversight of the decommissioning process. The NRC could also address concerns identified by stakeholders on the need for additional external stakeholder input into the decommissioning process. Specifically, several of the comments received on the ANPR and draft regulatory basis published for this rulemaking activity focused on the following: (1) a perceived lack of meaningful participation by State and local governments in the

decommissioning process, (2) a concern that the NRC did not present enough opportunities for public participation in decommissioning decision making activities (e.g., the lack of a public comment period afforded for exemptions), and (3) a desire for impacted communities around decommissioning facilities to have a larger voice in the decommissioning timeline and other activities that may directly affect the socioeconomic health of the local population.

To better inform the NRC staff, members of the public, and other stakeholders about the decommissioning process at specific facilities, the NRC would update RG 1.184, Revision 1, and RG 1.185, Revision 1, to indicate that licensees that are planning to create a community committee should add additional detail to the PSDAR on the creation of the community advisory board, the proposed membership of that board, and the ways in which the board will be used to promote stakeholder involvement in the decommissioning and decision making process. Alternatively, the PSDAR should discuss why the licensee did not consider a community advisory board necessary or prudent for the site and under what conditions it would reconsider such an advisory board as decommissioning progresses (e.g., would the licensee consider implementing a community advisory board when the facility moves from SAFSTOR to DECON).

PSDAR guidance documents could include additional details in the following areas to help licensees form a community engagement panel:

- A discussion of the composition of the proposed community advisory board to potentially include members from the licensee staff, representatives from appropriate State and local government agencies, officials or their designees from host communities and counties and communities within the surrounding emergency planning zone, and representatives from citizen groups.

- Provisions for when the community advisory board would be convened and the frequency at which meetings would take place. The NRC recognizes that formation of an independent decommissioning advisory panel that is engaged at the earliest stages of decommissioning planning is essential in developing a comprehensive process intended to maintain external stakeholder involvement.

- A discussion of the topics that would be brought before the community advisory board; how the board's input would be used to inform the decision making process for various decommissioning activities; and what interaction, if any, the board would have with the NRC or other Federal regulatory bodies (e.g., the U.S. Environmental Protection Agency or U.S. Department of Energy (DOE)) to support the board members' overall understanding of the decommissioning process and promote dialogue between the affected stakeholders, the NRC, and the decommissioning licensee.

- Provisions for how the community advisory board would be formed and implemented, including whether the State, licensee, or some other party would take charge of finding members for the board; who would be responsible for the logistics required to support the board's meetings and other routine activities (e.g., coordinating logistics, securing conference space and audiovisual equipment for presentations to the public); and the expected term of the board members.

5.2.2.2 Assessment of Option 2

Selection of this option would provide decommissioning licensees with additional guidance on best practices related to the formation of community advisory boards. This guidance would address aspects for which the NRC staff has needed to engage with licensees to obtain a more complete understanding as part of the agency's ongoing oversight of the decommissioning process, as well as topics that have been a concern for many stakeholders, without the need to further formalize PSDAR content in NRC regulations. This would continue to provide the flexibility that many decommissioning sites need in various stages of the process while adding transparency to the decommissioning process. Appropriate guidance updates related to the PSDAR, if licensees choose to implement them, could lead to an overall enhancement of considerations for the establishment of such community advisory boards.

5.2.3 Option 3—Rulemaking to Mandate Advisory Boards

5.2.3.1 Description of Option 3

In this option, the NRC staff would pursue rulemaking to (1) codify a requirement that all licensees entering into the decommissioning process must create a community advisory board and (2) establish provisions for minimum membership levels, the extent to which board input will be taken into consideration during the decommissioning process, the level of independence that the board will have to implement decisions regarding decommissioning activities at the facility, and the ability of the board to request meetings with the licensee and other stakeholders, including the NRC, to discuss certain topics that may be of significant interest during decommissioning. In addition, the NRC would require licensees to provide periodic (likely annual) updates to the NRC on the board's activities, the topics discussed at board meetings, the decisions made as they relate to the ongoing decommissioning of the plant, and the overall progress and status of decommissioning at the facility.

5.2.3.2 Assessment of Option 3

Selection of this option would remove some of the flexibility envisioned by the current decommissioning framework, which allows licensees or other stakeholders the option to establish community advisory boards that function depending on site-specific considerations, levels of stakeholder interest, and other individual factors that affect the decommissioning process at different facilities. In addition, as previously discussed, the AEA does not give the NRC the authority to require community involvement. If the NRC mandates that licensees create community advisory panels, it would be difficult to establish requirements that would generically apply to the wide range of decommissioning activities and the degree of stakeholder interest. In addition, the NRC staff notes that a community advisory body in some form has been present at nearly all previously decommissioned reactors without an NRC requirement. As such, mandating the creation of something that stakeholders are already voluntarily opting to implement has little added benefit. Therefore, implementation of a more formal structure to create a community advisory board would remove several of the flexibilities envisioned by the 1996 decommissioning rule, which is not necessary for protection of public health and safety.

5.3 Regulatory Scope

The NRC staff recommends no changes to the decommissioning regulations at this time.

5.4 NRC Guidance, Policy, and Implementation Issues

The NRC staff would revise RG 1.184, Revision 1, and RG 1.185, Revision 1, and update NUREG-0586 as needed to reflect the changes described in Option 2 of this section. Any update to the Decommissioning GEIS will be on a separate schedule than that of other guidance documents that may be revised as part of this decommissioning rulemaking.

5.5 Impacts on Public Health, Safety, and Security

5.5.1 Option 1—No Action

The no-action option would retain the provisions of the current decommissioning framework related to external stakeholder involvement in the decommissioning process, the role of State and local government entities in decommissioning decisions, and maintaining compliance with individual State requirements consistent with when the facilities were operating.

5.5.1.1 Impacts on Public Health, Safety, and Security

Maintaining the status quo would have no impact on public health, safety, and security because licensees have demonstrated that they can decommission their facilities in compliance with NRC requirements under the current community involvement framework.

5.5.1.2 Impacts on Licensees

Use of this option would have no impact on licensees because the level of effort and associated burdens related to choosing to create and then implementing a community advisory panel will be unchanged when compared to the current practices voluntarily undertaken by licensees.

5.5.1.3 Impacts on the NRC

Use of this option would have no impact on the NRC staff because the level of effort and associated burdens related to the NRC's involvement with licensee community advisory boards would be unchanged. Taking no action would also eliminate staff time dedicated to the rulemaking process.

5.5.1.4 Additional Considerations

Retaining the provisions of the current decommissioning framework in this area would provide the maximum flexibility. This flexibility enables the licensee to tailor these committees to suit the needs of, and stakeholder interest in, the decommissioning of the facility, with little, if any, additional benefit to public health and safety.

5.5.1.5 Summary of Benefits and Costs

Maintaining the current decommissioning framework related to external stakeholder involvement in the decommissioning process has no impact on the protection of public health and safety and no additional impact on the NRC or licensees in the decommissioning process.

5.5.2 Option 2—Guidance Development or Enhancement

Under this option, the NRC staff would update RG 1.184, Revision 1, and RG 1.185, Revision 1, to discuss best practices for creating a community advisory board at decommissioning facilities that choose to establish a community advisory board, including suggested best practices for membership, the anticipated level of community advisory board activity and involvement in the decommissioning process, and ways in which to leverage the community advisory board to assist in making decommissioning decisions. Before finalizing the guidance, the NRC would publish this updated guidance as draft RG 1.184, Revision 2, and draft RG 1.185, Revision 2, for public review and comment.

5.5.2.1 Impacts on Public Health, Safety, and Security

The guidance updates would maintain the current level of public health, safety, and security, increase the level of transparency, and promote a greater understanding by the general public and other stakeholders of the overall decommissioning process.

5.5.2.2 Impacts on Licensees

Use of this option would have a small impact on decommissioning licensees that choose to implement the guidance because they would increase the level of detail in the documentation included in the PSDAR. Although these changes would minimally increase the burden to licensees, they would give the NRC staff, members of the public, and other stakeholders an increased awareness of the role of citizen advisory boards in the decommissioning process.

5.5.2.3 Impacts on the NRC

Use of this option would have a small impact on the NRC staff because it would require an update to RG 1.184, Revision 1, and RG 1.185, Revision 1, and additional staff resources would be needed to review a potentially expanded level of detail in licensees' decommissioning documents. Although the NRC would need to expend additional resources in the near term to develop the guidance in RG 1.184 and RG 1.185, both the NRC and licensees would eventually save resources because the additional information provided would result in a more streamlined and predictable process that minimizes the need for additional regulatory interactions related to the decommissioning documents, and could reduce the number of stakeholder inquiries received on these documents. Further, such clarified guidance would help the NRC better plan resource needs for potential attendance at and participation in selected community advisory board activities. Also, this option would result in a greater level of overall regulatory transparency and openness in the NRC's decommissioning process for external stakeholders, which would offset this increased burden and would give stakeholders a better understanding of how local communities have the opportunity to be engaged in the decommissioning process.

5.5.2.4 Additional Considerations

The recommended guidance updates would increase the clarity and consistency in the implementing guidance. These recommended changes would also apply the principles of good regulation: independence, clarity, openness, reliability, and efficiency.

5.5.2.5 Summary of Benefits and Costs

Use of this option might increase the level of detail in the documentation submitted by licensees in the decommissioning process, which could lead to a better understanding of the decommissioning process by all stakeholders. This recommendation would maintain the current level of public health, safety, and security, and it would increase the level of transparency.

5.5.3 Option 3—Rulemaking to Mandate Advisory Boards

In this option, the NRC staff would pursue rulemaking to (1) codify a requirement that all licensees entering into the decommissioning process must create a community advisory board and (2) establish provisions for minimum membership levels, the extent to which board input will be taken into consideration during the decommissioning process, the level of independence the board will have to implement decisions regarding decommissioning activities at the facility, and the ability of the board to request meetings with the licensee and other stakeholders (including the NRC) to discuss topics that may be of interest during the decommissioning process.

5.5.3.1 Impacts on Public Health, Safety, and Security

There is no indication that mandating that licensees create community advisory panels would increase public health and safety, or enhance security.

5.5.3.2 Impacts on Licensees

Use of this option would have a moderate impact on licensees because of the level of effort and associated burdens related to creating a community advisory board regardless of the site-specific conditions and concerns that would usually help inform the decision of whether or not to pursue a formal community engagement panel. In addition, licensees in decommissioning would need to expend additional time and effort to provide the additional level of planning and logistical support required for a mandated community advisory board. For licensees, the changes would decrease their flexibility in conducting decommissioning activities, thereby decreasing efficiency and potentially delaying decommissioning activities.

5.5.3.3 Impacts on the NRC

Use of this option would have a high impact on the NRC. It would require the NRC to:

- promulgate new rule language for the imposition of regulations that differ significantly from the goals of the 1996 decommissioning rule and the objectives of this rulemaking;
- develop a regulatory and technical basis in support of conclusions that diverge from the current decommissioning process;
- create potentially complex requirements for establishing all-inclusive community advisory boards that take into account the widely varying scope of decommissioning activities;
- incorporate requirements associated with community advisory boards through numerous review and oversight activities associated with the decommissioning process; and

- conduct an assessment of whether imposing the new rule would constitute backfitting under 10 CFR 50.109 or violate issue finality under 10 CFR Part 52.

5.5.3.4 Additional Considerations

A community advisory body in some form has been present at nearly all previously decommissioned reactors without an NRC requirement. In addition, the mandated creation of a community advisory board for future plants entering decommissioning would potentially reduce the options available for licensees to address public and other stakeholder concerns during the decommissioning process. As such, mandating the creation of something that stakeholders are already voluntarily opting to implement has little added benefit and would decrease flexibility during decommissioning activities, thereby decreasing efficiency.

5.5.3.5 Summary of Benefits and Costs

Changing the current regulatory framework regarding mandated creation of community advisory boards during decommissioning would have a moderate impact on licensees in decommissioning and a high impact on the NRC without a corresponding increase in the level of protection of public health and safety.

5.6 Backfitting and Issue Finality Considerations

Option 1 would maintain the status quo of the current decommissioning regulations and guidance documents on external stakeholder involvement in the decommissioning process and the role of State and local government entities in decommissioning decisions. Option 2 would establish, but would not require the use of, guidance on an additional level of detail in the decommissioning documents regarding the formation of community advisory boards without the need for NRC regulations to further formalize the content of the PSDAR. These changes would not constitute backfitting as defined in 10 CFR 50.109 or a violation of issue finality under 10 CFR Part 52. Option 3, if selected, would implement new requirements related to the mandated creation of community advisory boards during decommissioning that could constitute a backfit under 10 CFR 50.109 or a violation of issue finality under 10 CFR Part 52. Selection of this option would require the NRC staff to conduct a backfit assessment to determine the consequences of imposing such a rule.

5.7 Stakeholder Feedback on the Draft Regulatory Basis

5.7.1 Feedback from Rulemaking Public Meetings

The NRC held two public meetings, one on December 9, 2015, to discuss the ANPR, and another on May 8–10, 2017, to discuss the draft regulatory basis and preliminary draft regulatory analysis for a future rulemaking on decommissioning commercial nuclear power plants. During these meetings, the staff received feedback on the need for the NRC to mandate community advisory boards during decommissioning. Many of these comments focused on (1) a perceived lack of meaningful participation by State and local governments in the decommissioning process, (2) a concern that the NRC did not present enough opportunities for public participation in decommissioning decision making activities (e.g., the lack of a public comment period afforded for regulatory exemptions), and (3) a desire for impacted communities around decommissioning facilities to have a larger voice in the decommissioning timeline and

other activities that may directly affect the socioeconomic health of the local population. The NRC staff considered these observations while preparing its recommendations in this appendix.

5.7.2 Main Themes from Public Comment Submissions

During the public comment period for the draft regulatory basis, as part of the more than 40 submissions received, the NRC received roughly 25 comment submissions directly related to Appendix H. Some commenters stated that the NRC should not mandate the formation of community advisory boards because this would remove the flexibility necessary for different decommissioning licensees to engage with the various State and local organizations interested in the decommissioning process at the sites with the level of interaction that is needed for that particular site. In addition, these commenters noted that, because all previous and current decommissioning licensees have engaged in some form of community engagement or advisory panel, further requirements in this area are an attempt to solve a problem that does not exist.

Some commenters noted that the recommended guidance changes would not make the decommissioning process more efficient or improve community engagement. These commenters argued that there is no need for additional guidance based on industry experience with community engagement at decommissioning sites. Other comments supported an increased role for State and local governments and public groups in the decommissioning process. These commenters advocated that the NRC require the formation of a community advisory panel to enhance the opportunity for public involvement in the decommissioning process. These commenters also suggested that the NRC should provide other opportunities for meaningful public input and involvement in the decommissioning process. Commenters also argued that to enhance the role of States, host communities, other stakeholders, and interested members of the public, those groups should have opportunities equal to that of licensees. These commenters argued that the NRC give stakeholders other than licensees the opportunity to engage with the NRC staff responsible for overseeing the decommissioning of a facility, in a manner similar to the NRC practice for “government to government consultation.”

The NRC received mixed comments about the best method for establishing a community advisory board. Some comments supported a process that requires an initial meeting between stakeholders to determine the nature of the community advisory board and to establish provisions for minimum membership levels; the extent to which board input will be taken into consideration during the decommissioning process; the level of independence the board will have to implement decisions on decommissioning activities at the facility; and the ability of the board to request meetings with the licensee and other stakeholders, including the NRC, to discuss certain topics that may be of significant interest during the decommissioning process.

Other comments supported the formation of community advisory boards for fostering communication between the licensee and the public. However, those commenters did not recommend that the NRC require that advisory panels form out of concern that membership of the panels would not adequately represent all stakeholders. Instead the commenters recommended that the panels form at the State and local level by a means appropriate to the communities surrounding the decommissioning power reactor. The commenters recommended that the NRC require licensees to support community advisory panels, by providing funding, access to meeting spaces, and making appropriate office equipment available. Other commenters provided general feedback about community engagement. One commenter requested that the NRC staff consider use of the IAEA model for stakeholder participation. Two commenters expressed dissatisfaction with the level of substantive public communication and

engagement during the decommissioning process. Another commenter requested that the NRC fully consider all public comments and use plain language when responding.

5.7.3 NRC Response to Comments

In response to the comments received on the draft regulatory basis, the NRC staff has modified parts of the recommended changes to RG 1.184, Revision 1, and RG 1.185, Revision 1, to reflect more fully the nature of the information that the NRC is seeking in the decommissioning documents as part of the recommended guidance updates and to remove areas that are outside the scope of the current rulemaking activity or not appropriate to address in the early phases of decommissioning described in the PSDAR. Specifically, as part of these changes, the NRC staff is no longer proposing to include in guidance that a licensee should include a discussion on how it would maintain stewardship and compliance with all State and local regulations in effect during decommissioning, including nonradiological effluent releases, environmental monitoring, and emergency planning considerations, because these considerations are either reflected elsewhere in the decommissioning process (see Section 2 of this appendix) or are more appropriately captured as part of other regulatory processes. However, the staff is recommending the retention of other guidance enhancements on the formation of community advisory committees so that best practices can be captured and made available for the use by licensees that will enter the decommissioning process in the future.

The NRC staff notes many comments supported the creation of a community engagement mechanism in some form at all decommissioning sites. As already noted, the NRC strongly recommends that licensees involved in decommissioning activities form a community committee or other advisory organization aimed at fostering communication and information exchange between the licensee and members of the community affected by decommissioning. Although not a regulatory requirement, all decommissioning licensees to date have created some form of community advisory board, with membership and activity levels commensurate with the overall level of interest in the decommissioning activities at the facility. The NRC staff agrees that this practice should be continued, and the NRC's proposal to add recommendations to its guidance documents for how best to form these community committees does not remove the flexibility currently available for licensees to approach decommissioning in a manner that best suits their specific site, State, and local community needs. This approach would also not violate the tenets of the AEA that require the NRC to be an independent regulator or the statutory limits of the authority given to the NRC that do not permit the NRC to mandate that non-licensee stakeholders participate in the decommissioning process.

For this reason, and given the lack of a compelling public health and safety reason to mandate creation of community advisory boards, the NRC has no basis to mandate the creation of community outreach organizations. In addition, within the limits of the NRC's authority, the agency has no mechanism to mandate non-licensee stakeholder participation on community advisory committees or other such organizations at decommissioning facilities. Any requirements to simply have licensees form some type of committee would be so broad and open-ended that they would create no additional benefits or improvements over the current practice of community committees being formed on an ad hoc basis to fit the needs of the specific decommissioning site. In addition, it would be difficult to establish requirements that would generically apply to the wide range of decommissioning activities and the degree of stakeholder interest at various decommissioning facilities. Finally, under the existing decommissioning regulations, the NRC already involves the public, State, and local government and other stakeholders in the decommissioning activities.

The NRC staff also notes that the agency engages frequently with international nuclear regulatory bodies, including the IAEA and others, to ensure that the guidance and other positions under consideration by the agency align in principle with those of other regulatory agencies. To this end, the NRC will compare the guidance updates considered in this appendix (i.e., removal of entombment as a decommissioning option and the importance of stakeholder involvement in the decommissioning process) to those of the IAEA and other nuclear regulatory bodies during the rule and guidance development phase. The NRC will make the guidance documents available for public review and comment before finalizing them.

The NRC makes information available to the public in as transparent a manner as possible throughout the decommissioning process and ensures that the information is written in "plain language" whenever possible. However, the agency recognizes that much of the documentation that supports decommissioning is highly technical and can be difficult to navigate or comprehend. For this reason, the NRC encourages stakeholders to make use of the NRC public Web site where much of this information has been summarized or cross-referenced to be easier to locate and manage. In addition, the agency is currently in the process of updating the public Web site to contain more updated and useful information relative to decommissioning activities at specific facilities and the overall process in general.

The NRC maintains a level of oversight at decommissioning power reactors commensurate with the reduced risks at a permanently shutdown facility. The decommissioning licensees and NRC staff interact numerous times during the transition to a decommissioning status. In addition, the NRC conducts frequent inspections under the Decommissioning Power Reactor Inspection Program (IMC 2561) to maintain an appropriate level of oversight and engagement throughout the decommissioning process. The results of all these inspection activities (unless they are security related) are available to the public in ADAMS.

5.8 NRC Staff Recommended Approach

The NRC staff has determined that no public health or safety improvements would be gained by changes to the NRC regulatory framework in this area. The NRC staff based this finding on its consideration of the AEA, lessons learned, stakeholder comments on the ANPR and draft regulatory basis published for this rulemaking activity, other information that informed previous decommissioning rulemaking, and an assessment of the ongoing decommissioning activities currently taking place under the current requirements. Therefore, given the NRC staff's desire to maintain safety and improve efficiency, effectiveness, and transparency in the regulatory process for decommissioning nuclear power plants, the NRC staff recommends Option 2 (Guidance Development or Enhancement). This option would add guidance on best practices for engaging the community during the decommissioning process and would allow stakeholders access to more detailed information in the PSDAR for those licensees that choose to implement the enhanced guidance. This option would not reduce the flexibility that the current decommissioning regulations provide regarding the formation of a community advisory board, or impose unnecessary burdens on licensees and the NRC staff to create additional regulations and procedures that do not have any net positive impact on public health and safety.

6 RECORD RETENTION REQUIREMENTS

6.1 Existing Regulatory Framework

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 requires licensees to retain certain records throughout the life of the unit.

- Criterion XVII of Appendix B 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) requires licensees to maintain certain records until termination of a license issued under 10 CFR Part 50.

- 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 and/or for certain types of records to be kept in duplicate. Licensees that have previously been granted these exemptions used the justification that, when the associated 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).

Records associated with SSCs that maintain compliance or that protect public health and safety during the decommissioning process are excluded from these exemptions from certain recordkeeping regulations. Examples include those SSCs associated with programmatic controls such as 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 records retention requirements of 10 CFR 50.75, “Reporting and Recordkeeping for Decommissioning Planning,” or any other requirements of 10 CFR Part 50 that apply to decommissioning.

The NRC granted record retention exemptions based on a finding of reasonable assurance that the licensee would continue to meet the underlying purpose of the recordkeeping regulations (see exemption approval letters for the La Crosse Boiling Water Reactor, dated July 18, 2016 (ADAMS Accession No. ML15355A103), and SONGS, dated July 18, 2016 (ADAMS Accession No, ML15355A055)). In the SOC for the final rulemaking titled, "Retention Periods for Records" (53 FR 19240; May 27, 1988), in response to public comments received during the rulemaking process, the Commission explained that the purpose of the recordkeeping requirements 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 the SOC, the Commission also 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" (53 FR at 19243). Because the SSCs that were safety related or important to safety are removed from the licensing basis and removed from the plant during the decommissioning process, the records identified in the associated exemptions will no longer be required to achieve the purpose of the records retention rule.

The recordkeeping exemptions are also based on a determination that the licensee meets the requirements in 10 CFR 50.12 and 10 CFR 72.7, "Specific exemptions." The NRC will not consider exemptions under 10 CFR 50.12 for approval unless special circumstances exist and the exemptions are authorized by law, will not present an undue risk to public health and safety, and are consistent with the common defense and security. The NRC will not consider exemptions under 10 CFR 72.7 for approval unless such exemptions are authorized by law, will not endanger life or property or the common defense and security, and are in the public interest.

6.2 Regulatory and Rulemaking Options

The NRC is undertaking this rulemaking, in part, to streamline the regulatory aspects of decommissioning by minimizing the need for licensees to seek exemptions from requirements that are not necessary once the licensee permanently ceases operation and removes fuel from the reactor vessel. In support of this effort, the NRC evaluated what records must be retained in support of decommissioning activities until license termination and which records may be removed after the associated SSCs are no longer in service under the NRC license, have been dismantled or demolished, and will not serve any NRC-regulated functions in the future. The NRC evaluated two options: (1) no action and (2) rulemaking to change the applicability of the recordkeeping requirements for nuclear plants that have formally entered the decommissioning process. A description and the NRC staff's assessment of each option follow.

6.2.1 Option 1—No Action

6.2.1.1 Description of Option 1

The no-action option would retain the status quo and all provisions of the current recordkeeping and record retention regulations in 10 CFR 50.59(d)(3); 10 CFR 50.71(c); 10 CFR Part 50, Appendix A, General Design Criterion 1; 10 CFR Part 50, Appendix B, Criterion XVII; and 10 CFR 72.72(d). Under this option, 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 staff would continue to review these exemptions on a case-by-case basis.

6.2.1.2 Assessment of Option 1

Maintaining the current recordkeeping and record retention requirements for decommissioning licensees would continue to meet the underlying purpose of the recordkeeping regulations for certain records, but it would also affect future plants transitioning to a decommissioning status that must seek NRC approval for any exemptions from these recordkeeping requirements. The continued use of the exemption process to eliminate record retention requirements during decommissioning would create a burden on the NRC staff to review these individual requests. The process of preparing, submitting, and reviewing exemptions from the record retention requirements is not an efficient use of NRC or licensee resources.

6.2.2 Option 2—Rulemaking to Decrease Record Retention Requirements during Decommissioning

6.2.2.1 Description of Option 2

Through this rulemaking effort, the NRC would seek to change its regulations to minimize the need for regulatory exemptions related to recordkeeping and record retention requirements during decommissioning. Once the NRC dockets a licensee's notifications of permanent cessation of operation and permanent removal of fuel from the reactor vessel under 10 CFR 50.82(a)(2), it would allow decommissioning licensees to eliminate records associated with SSCs that no longer serve any NRC-regulated function. The NRC would allow this change as long as appropriate change mechanisms, such as the 10 CFR 50.59 evaluation process or NRC-approved technical specification (TS) changes, are used to assess the removal of those records to determine that elimination of the records will have no adverse impact on public health and safety. This rulemaking alternative would include the following five changes for recordkeeping and record retention requirements to minimize exemptions and to enhance the efficiency of the decommissioning regulations:

1. Amend 10 CFR Part 50, Appendix A, 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 dockets 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 any affected implementation or guidance documents that the 10 CFR Part 50, Appendix B, Criterion XVII, requirements 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 10 CFR 50.71(c) to specify that licensees for which the NRC has docketed the certifications required under 10 CFR 50.82(a)(1) and 10 CFR 52.110(a) are not required to retain records associated with SSCs that have been or will be removed from service under the NRC license, dismantled, or demolished as long as the licensee has determined under an appropriate NRC-approved change process that these SSCs will not serve any NRC-regulated safety purpose in the future.

4. Amend 10 CFR 50.59(d)(3) to clarify that records of changes in the facility must be maintained until the termination of an operating license except as specified by the language in the revised 10 CFR 50.71, "Maintenance of records, making of reports," as described above.

5. Amend 10 CFR 72.72(d) to allow for records of spent fuel, high-level radioactive waste, and reactor-related greater than Class C (GTCC) waste containing special nuclear material to 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.

   The NRC staff notes that, 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.

   ISFSI records 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. ISFSI records also include historical records that have been gathered and collected during plant and ISFSI operations; these records are either required for support of the dry cask storage systems stored 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, 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.

These recommended changes would increase regulatory efficiency and decrease the burden on licensees and the NRC staff in the application of the recordkeeping and record retention requirements during decommissioning and will apply the principles of good regulation: independence, clarity, openness, reliability, and efficiency. These changes would also give licensees the flexibility to consider keeping their ISFSI records in a single storage facility.

6.2.2.2 Assessment of Option 2

The specific purpose of the record retention rules is to assist the NRC in carrying out its mission to protect public health and safety by ensuring that the licensing and design basis of the facility is understood, documented, preserved, and retrievable in such a way that will aid the NRC in determining compliance and noncompliance, taking action on possible noncompliance, and examining facts following an incident. These regulations apply to decommissioning licensees despite the fact that during the decommissioning process, safety-related SSCs are retired or disabled and subsequently removed from NRC licensing basis documents through appropriate change mechanisms, such as through 10 CFR 50.59 evaluations or NRC-approved changes to the TS. Appropriate removal of an SSC from the licensing basis requires either a determination by the licensee or approval from the NRC that the SSC no longer has the potential to cause an accident, event, or other problem that would adversely impact public health and safety.

The records subject to removal under the recordkeeping and record retention exemptions are associated with SSCs that had been important to safety during power 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. If 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 and noncompliance, taking action on possible noncompliance, and examining facts following an incident. Therefore, retention of such records would not serve the underlying purpose of the rule.

In addition, once removed from the licensing basis documents, SSCs are no longer governed by the NRC's regulations and, therefore, are not needed to ensure adequate protection of public health and safety. For this reason, retention of records associated with SSCs that are or will no longer be part of the facility serves no safety or regulatory purpose, nor the underlying purpose of the rule of maintaining compliance with the safety and health aspects of the nuclear environment in order to accomplish the NRC's mission. Records that continue to serve the underlying purpose of the rule (i.e., to maintain compliance and to protect public health and safety in support of the NRC's mission) will continue to be retained in accordance with the regulations in 10 CFR Part 50 and 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." These retained records not subject to the exemption include those associated with programmatic controls, such as those pertaining to residual radioactivity, security, and QA, and records associated with the ISFSI and spent fuel.

The retention of records required by 10 CFR 50.59(d)(3); 10 CFR 50.71(c); 10 CFR Part 50, Appendix A, General Design Criterion 1; and 10 CFR Part 50, Appendix B, Criterion XVII provides assurance that records associated with SSCs will be captured, indexed, and stored in an environmentally suitable and retrievable condition. Given the volume of records associated with the SSCs, compliance with the records retention rule results in a considerable cost to the licensee. Retention of the volume of records associated with the SSCs during the operational phase is appropriate to serve the underlying purpose of determining compliance and noncompliance, taking action on possible noncompliance, and examining facts following an incident (as discussed above). However, the cost effect of retaining operational-phase records beyond the operational phase until the termination of the license was not fully considered or understood when the records retention rule was put in place. For example, existing records storage facilities are often eliminated as decommissioning progresses. Retaining records associated with SSCs and activities that no longer serve a safety or regulatory purpose would thereby require new facilities and retention of otherwise unneeded administrative support personnel. As such, compliance with the rule would result in an undue cost in excess of that contemplated when the rule was adopted.

Although licensees will retain the records required by their license as the plant transitions from operating conditions to a fully decommissioned state, plant dismantlement will obviate the regulatory and business 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 licensee will seek exemption from the records retention requirements for 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, and retaining irrelevant records. The granting of these recordkeeping and record retention exemptions only expedites 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.

The only records that would not be affected by this change are those records associated with SSCs that maintain compliance, protect public health and safety during the decommissioning process, or are associated with SSCs the licensee may intend to repurpose or sell during the decommissioning process (e.g., many of the turbine units and spare parts at decommissioning units could be used or purchased by operating nuclear power plants). Other examples include those SSCs associated with programmatic controls such as controls pertaining to residual radioactivity, security, QA and those SSCs associated with spent fuel assemblies or the SFP (while assemblies are still in the pool) and ISFSIs. These changes do not impact the records retention requirements of 10 CFR 50.75 or any other decommissioning requirements.

The exemption requested by decommissioning licensees from the portion of 10 CFR 72.72(d) that requires records for spent fuel in storage to be kept in duplicate for the ISFSI meets the recordkeeping requirements of 10 CFR Part 50, Appendix B, and other applicable 10 CFR Part 72 requirements for the storage and maintenance of the spent fuel records in accordance with an NRC-approved QAP. Specifically, 10 CFR 72.140(d) states that a QA program that the NRC has approved as meeting the applicable requirements of 10 CFR Part 50, Appendix B, will be accepted as satisfying the requirements of 10 CFR 72.140(b) for establishing an ISFSI QA program; however, the licensee must also meet the recordkeeping provisions of 10 CFR 72.174, "Quality assurance records." In addition, the exemption will not affect the record content, retrievability, or retention requirements specified in 10 CFR 72.72, "Material balance, inventory, and records requirements for stored materials," or 10 CFR 72.174 such that the licensee will continue to meet all other applicable record requirements for the ISFSI and associated special nuclear materials.

In granting these exemptions, the NRC staff determined that the process and procedures that will be 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) will help ensure that the licensee will adequately maintain the required spent fuel information. Therefore, exemption from the duplicate record requirement of 10 CFR 72.72(d) will not affect public health and safety and will not endanger life or property in accordance with 10 CFR 72.7. 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 provides for greater efficiency in the storage of all records once the facility enters the final stages of decommissioning whereby only the ISFSI facility will remain after license termination. Requiring a separate method for the storage of certain ISFSI QA records diverts resources from decommissioning activities. Therefore, exemption from 10 CFR 72.72(d) is in the public interest because it allows decommissioning to be accomplished more efficiently and effectively without the need to maintain separate records storage systems.

6.3 Regulatory Scope

The NRC would amend 10 CFR 50.59(d)(3); 10 CFR Part 50, Appendix A, General Design Criterion 1; 10 CFR Part 50, Appendix B, Criterion XVII; 10 CFR 50.71(c); and 10 CFR 72.72(d), as applicable, to remove certain record retention and duplication requirements for SSCs that no longer remain in service after decommissioning and for certain ISFSI records.

6.4 NRC Guidance, Policy, and Implementation Issues

The NRC is not proposing any changes to the decommissioning guidance, policy, or implementation documents at this time to reflect potential changes to the recordkeeping and record retention requirements. If conforming changes are needed to add clarity on this topic to any of these documents (i.e., RG 1.184) once this rulemaking activity is complete, the NRC will address those changes during routine revisions of and updates to the affected documents.

6.5 Impacts on Public Health, Safety, and Security

6.5.1 Option 1—No Action

The no-action option would retain the provisions of the current regulations on the recordkeeping and record retention requirements that apply during decommissioning.

6.5.1.1 Impacts on Public Health, Safety, and Security

Maintaining the status quo will have no impact on public health, safety, and security.

6.5.1.2 Impacts on Licensees

Use of this option would have no impact on licensees because the level of effort and associated burdens related to preparation and submittal of requests for exemptions from the recordkeeping and record retention requirements during decommissioning will be unchanged.

6.5.1.3 Impacts on the NRC

Use of this option would have no impact the NRC staff because the level of effort and associated burdens related to review of requests for exemptions from the recordkeeping and record retention requirements during decommissioning will be unchanged. Taking no action will also eliminate staff time dedicated to the rulemaking process.

6.5.1.4 Additional Considerations

Preparing, submitting, and reviewing exemptions from the recordkeeping and record retention requirements during decommissioning is not an efficient use of NRC or licensee resources.

6.5.1.5 Summary of Benefits and Costs

Maintaining the current recordkeeping and record retention regulations that apply during decommissioning has no impact on the protection of public health and safety and no additional benefit or cost to the NRC or licensees in the decommissioning process.

6.5.2 Option 2—Rulemaking to Decrease Record Retention Requirements during Decommissioning

Under this option, the NRC staff would pursue rulemaking to change its regulations to minimize the need for regulatory exemptions related to recordkeeping and record retention requirements during decommissioning. Once the NRC dockets notifications of permanent shutdown and removal of fuel from the reactor vessel, it would allow decommissioning licensees to eliminate records associated with SSCs that no longer serve any NRC-regulated function as long as

appropriate change mechanisms 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.

6.5.2.1 Impacts on Public Health, Safety, and Security

Option 2 would maintain the current level of public health, safety, and security, increase the level of transparency and efficiency, and promote a greater understanding by the general public and other stakeholders of the decommissioning process.

6.5.2.2 Impacts on Licensees

Use of this option would have a positive impact on decommissioning licensees because it would eliminate or reduce the need to request recordkeeping and record retention exemptions during decommissioning and would remove requirements to retain records that are not important to the license termination process because they refer to SSCs that are no longer in service. The change would also give licensees the flexibility to store ISFSI spent fuel records in the same manner as that of other QA records at the site. These changes would represent a decreased burden to licensees and add efficiency to the record storage process during decommissioning.

6.5.2.3 Impacts on the NRC

Use of this option would have a positive impact on the use of NRC staff resources. The NRC staff would no longer divert resources from other agency activities to evaluate each request. This option would have a small impact on the NRC staff because it would require the NRC staff to promulgate rule language that is aligned with the exemptions previously granted to decommissioning licensees regarding recordkeeping and record retention requirements.

6.5.2.4 Additional Considerations

The recommended updates would add clarity and consistency to the guidance, and would also apply the principles of good regulation: independence, clarity, openness, reliability, and efficiency. Use of this option would establish greater efficiency related to recordkeeping and record retention requirements during decommissioning. Additional efficiencies will be accomplished for both decommissioning licensees and the NRC staff through the reduction or elimination of recordkeeping-related exemption requests.

6.5.2.5 Summary of Benefits and Costs

The reliance on exemptions creates uncertainties and regulatory burdens on decommissioning licensees and the NRC staff. Under this option, 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 staff'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.

6.6 Backfitting and Issue Finality Considerations

Option 1 would maintain the status quo of the current regulations for recordkeeping and record retention during decommissioning and the need to seek specific exemptions to those requirements as needed. Option 2 would change the NRC regulations to minimize the need for regulatory exemptions related to recordkeeping and record retention requirements during decommissioning. These changes would not constitute backfitting as defined in 10 CFR 50.109 or a violation of issue finality under 10 CFR Part 52 because recordkeeping and reporting requirements are outside the purview of backfitting.

6.7 Stakeholder Feedback on the Draft Regulatory Basis

6.7.1 Feedback from Rulemaking Public Meetings

The NRC held two public meetings, one on December 9, 2015, to discuss the ANPR, and another on May 8–10, 2017, to discuss the draft regulatory basis and preliminary draft regulatory analysis for a future rulemaking on decommissioning commercial nuclear power plants. During these meetings, the staff received feedback that, if the NRC staff intends to take a holistic look at the overall decommissioning process as part of this rulemaking activity, the agency should also address other exemptions routinely needed during decommissioning, including those from the current recordkeeping and record retention requirements. As a result, the NRC staff added the proposal for additional rulemaking in the area of records retention while preparing its recommendations for this appendix.

6.7.2 Main Themes from Public Comment Submissions

During the public comment period for the draft regulatory basis, as part of the more than 40 submissions received, the NRC received roughly 25 comment submissions directly related to Appendix H. Some commenters stated that rulemaking to change the recordkeeping and record retention requirements to more appropriately reflect the decommissioning process would represent an added efficiency to both the NRC staff and licensees. In addition, these commenters noted that, because all previous and current decommissioning licensees have requested exemptions in this area, rulemaking changes to codify these exemptions would increase regulatory clarity and stability for future decommissioning licensees.

6.7.3 NRC Response to Comments

In response to the comments received on the draft regulatory basis, the NRC staff has added a section to the regulatory basis to discuss the recordkeeping and record retention requirements that are appropriate during decommissioning and to recommend rulemaking to change those requirements to better reflect the record retention and storage requirements for decommissioning facilities. These changes increase regulatory efficiency and decrease burden in the application of the recordkeeping and record retention requirements during decommissioning, and will apply the principles of good regulation to ensure independence, clarity, openness, reliability, and efficiency in implementing the associated regulations.

6.8 NRC Staff Recommended Approach

The NRC staff has determined that no public health or safety improvements would be gained by regulatory changes in this area. The NRC staff based this finding on its consideration of the

SOC for the record retention rule, lessons learned, stakeholder comments on the ANPR and draft regulatory basis published for this rulemaking activity, other data that informed the current recordkeeping and record retention requirements, and an assessment of the ongoing decommissioning activities currently taking place under these requirements (as exempted). Therefore, given the agency's desire to maintain safety, reduce unnecessary regulatory burden, and improve efficiency and effectiveness in the regulatory process for decommissioning nuclear power plants, the NRC staff recommends Option 2 (Rulemaking to Decrease Record Retention Requirements during Decommissioning).

This option would increase regulatory efficiency and decrease burden in the application of the recordkeeping and record retention requirements during decommissioning and will apply the principles of good regulation to ensure independence, clarity, openness, transparency, reliability, and efficiency in implementing the associated regulations. Although these changes would have no direct impact on 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. In addition, by addressing this issue through rulemaking instead of continuing with the current case-by-case approach in reviewing exemptions, the overall impact on resources will likely be a reduction in the NRC staff's and decommissioning licensee's time expended on the exemption process in the future, which would enhance efficiency.

7 TRANSPORTATION INVESTIGATION, TRACING, AND REPORTING REQUIREMENTS

7.1 Existing Regulatory Framework

Section III.E of Appendix G to 10 CFR Part 20 contains requirements for investigating, tracing, and reporting shipments of low level radioactive waste (LLW) if the licensee[22] 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 often 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 requested extension of 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, other modes of shipment such as rail, barge, or mixed-mode shipments such as combination truck/rail, barge/rail, and barge/truck shipments may take more than 20 days to reach their destination due to delays in the route that are outside the licensee or 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 licensee would continue to meet the underlying purpose of the LLW transportation regulations (see exemption approval letters for the Zion Nuclear Power Station, Units 1 and 2, dated January 30, 2015 (ADAMS Accession No. ML15008A417), and the Humboldt Bay Power Plant, Unit 3, dated December 11, 2009

[22] Section 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." Given that the shipments discussed in Section 7 of this appendix are made by licensees, the section uses the term "licensee" in lieu of the term "shipper."

(ADAMS Accession No, ML093070167)). The underlying purpose of 10 CFR Part 20, Appendix G, Section III.E, is to require licensees to investigate, trace, and report radioactive shipments that have not reached their destination, as scheduled, for unknown reasons (60 FR 15649; March 27, 1995, as amended at 60 FR 25983; May 16, 1995). The approved exemptions from the LLW transportation investigation requirement have been based on a determination that the licensee meets the requirements in 10 CFR 20.2301, "Applications for exemptions." The NRC will not consider exemptions under 10 CFR 20.2301 for approval unless the exemptions are authorized by law and will not result an undue hazard to life or property.

7.2 Regulatory and Rulemaking Options

The NRC is considering rulemaking to minimize the need for licensees to seek exemptions from the investigation, tracing, and reporting requirements for LLW transportation by extending the receipt of notification period from 20 days to 45 days after transferring LLW from an operating or decommissioning facility. This change would apply to LLW shipments made by all modes of transportation, including LLW shipments made solely by truck. The NRC considered and evaluated two options: (1) no action and (2) rulemaking to extend the receipt notification window to 45 days after transferring LLW from any licensed facility. A description and the NRC staff's assessment of each option follow.

7.2.1 Option 1—No Action

7.2.1.1 Description of Option 1

The no-action option would retain the status quo and all provisions of the current investigation, tracing, and reporting requirements for LLW transportation in 10 CFR Part 20, Appendix G, Section III.E. Under this option, licensees would still need to apply for exemptions under 10 CFR 20.2301 to extend the receipt notification window beyond the 20 day timeframe set forth in the current regulation. The NRC staff would continue to review and approve these exemptions on a case-by-case basis.

7.2.1.2 Assessment of Option 1

Maintaining the current regulatory environment with respect to the investigation, tracing, and reporting requirements for LLW transportation for licensees, including those conducting decommissioning activities, will continue to meet the safety and regulatory requirements envisioned by the current regulations, and will impact future licensees transitioning to a decommissioning status that must seek NRC approval for any exemptions from these LLW transportation requirements. The continued use of the exemption process to extend the receipt notification window for transferring LLW will also create a burden on the NRC staff to review and approve individual exemption requests.

7.2.2 Option 2—Rulemaking to Change the Requirements of the Investigation, Tracing, and Reporting Timeframe for Low-Level Waste Transportation

7.2.2.1 Description of Option 2

Through this rulemaking effort, the NRC would seek to amend its regulations to minimize the need for regulatory exemptions related to the 10 CFR Part 20, Appendix G investigation, tracing, and reporting requirements for LLW transportation from all licensed facilities. Specifically, the NRC would extend the receipt notification window to 45 days after licensees

transfer LLW from a licensed facility to a disposal site. This change would continue to meet the underlying purpose of 10 CFR Part 20, Appendix G, Section III.E, which requires licensees to investigate, trace, and report LLW shipments that have not reached their destination, as scheduled, for unknown reasons.

The NRC would recommend these changes to the investigation, tracing, and reporting requirements for LLW transportation to minimize exemption requests and enhance efficiency of the decommissioning process and the overall LLW transfer and disposal requirements. Specifically, the NRC would change the language in 10 CFR Part 20, Appendix G, Section III.E, to require that the licensee must investigate, trace, and report any shipment or part of a LLW shipment for which notification of receipt has not been received within 45 days after transfer.

7.2.2.2 Assessment of Option 2

This option would increase regulatory efficiency, decrease burden in the application of the investigation requirements for LLW transportation, and maintain the current level of public health and safety. Specifically, the staff notes that, in accordance with the Department of Transportation (DOT) requirements for the shipment of LLW, the disposal containers or transport packages used to transport LLW must be demonstrated to release no radioactivity (above background levels) upon contact with the surface of the container before they can be shipped by any means. In addition, each disposal container must be secured in such a way that opening the container without the appropriate keys or security devices would not be possible. As such, delaying the receipt notification window from 20 days to 45 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) personnel 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 staff also notes that, for LLW waste shipments, most licensees 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 entire 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 licensee is unlikely. Furthermore, by extending the elapsed time for receipt acknowledgment to 45 days before requiring investigations and reporting, a reasonable upper limit on shipment duration (based on historical analysis) is still maintained if a breakdown of normal tracking systems were to occur.

The decommissioning process at nuclear power plants produces large volumes of slightly contaminated debris that are generated and require disposal. Smaller volumes of LLW are also generated during the operation of nuclear power plants and other licensed facilities and may be shipped to disposal facilities while the facility is still operating. Licensees typically ship LLW by rail to distant locations such as the waste disposal facility operated by Energy*Solutions* in Clive, Utah; waste processors in Texas; other LLW disposal facilities; or a combination of these. Experience with waste shipments from decommissioning power reactor sites indicates that transportation time to waste disposal facilities has, in several instances, exceeded the 20-day receipt of notification requirement in 10 CFR Part 20, Appendix G, Section III.E. Specifically, data from the San Onofre Nuclear Generating Station found that rail and truck/rail shipments of LLW took over 16 days on average and occasionally took up to 57 days.

In addition, administrative processes at the disposal facility and mail delivery times could further delay the issuance or receipt of notification. Therefore, in granting exemptions from the investigation requirements for LLW transportation, the NRC staff acknowledges that, based on the operational history of LLW shipments, the need to investigate, trace, and report on shipments that take longer than 20 days could create an excessive administrative burden on the part of the licensee that is not related to a significant impact on public health and safety. Further, by extending the elapsed time for receipt acknowledgment to 45 days before requiring investigations, tracing, and reporting, a reasonable upper limit on shipment duration (based on historical analysis) is still maintained if a breakdown of normal tracking systems were to occur.

7.3 Regulatory Scope

The NRC would amend 10 CFR Part 20, Appendix G, Section III.E, by extending the period, from 20 days after transfer from the licensed facility to 45 days after transfer, before the licensee has to initiate an investigation, and fulfill the tracing and reporting requirements, for an LLW shipment for which notice of receipt has not yet been received. This recommended amendment is based on operating experience that shows that this amount of time for notification of receipt of LLW shipments is reasonable.

7.4 NRC Guidance, Policy, and Implementation Issues

The NRC is not proposing any changes to associated guidance documents at this time. If conforming changes are needed to add clarity on this topic to any of these documents (i.e., RG 1.184) once this rulemaking activity is complete, the NRC will address those changes during routine revisions of and updates to the affected documents.

7.5 Impacts on Public Health, Safety, and Security

7.5.1 Option 1—No Action

The no-action option would retain the provisions of the current regulation on the 10 CFR Part 20, Appendix G investigation, tracing, and reporting requirements for LLW transfers from all licensed facilities.

7.5.1.1 Impacts on Public Health, Safety, and Security

Maintaining the status quo would have no impact on public health, safety, and security.

7.5.1.2 Impacts on Licensees

Use of this option would have no impact on licensees because the level of effort and associated burdens related to preparation and submittal of regulatory exemptions from the investigation requirements for LLW transportation would be unchanged.

7.5.1.3 Impacts on the NRC

Use of this option would have no impact on the NRC staff engaged in licensing reviews because the level of effort and associated burdens related to review of exemptions from the investigation requirements for LLW transportation will be unchanged. Taking no action would also eliminate staff time dedicated to the rulemaking process.

7.5.1.4 Additional Considerations

The process of preparing, submitting, and reviewing exemptions from the investigation requirements for LLW transportation is not an efficient use of NRC or licensee resources, especially considering these exemption requests are largely standardized between facilities.

7.5.1.5 Summary of Benefits and Costs

Maintaining the current 10 CFR Part 20, Appendix G investigation, tracing, and reporting requirements for LLW transportation has no impact on the protection of public health and safety and no additional benefit or cost to the NRC or licensees in the decommissioning process.

7.5.2 Option 2—Rulemaking to Change the Requirements of the Investigation, Tracing, and Reporting Timeframe for Low-Level Waste Transportation

Under this option, the NRC staff would pursue rulemaking to change its regulations to minimize the need for regulatory exemptions related to the 10 CFR Part 20, Appendix G investigation, tracing, and reporting requirements for LLW transportation that apply during both operation and decommissioning at all licensed facilities. Specifically, these licensees would be allowed to extend the receipt notification window to 45 days after transferring LLW from the facility.

7.5.2.1 Impacts on Public Health, Safety, and Security

Option 2 would maintain the current level of public health, safety, and security, as well as increase the efficiency of the regulatory process. Due to the DOT and 10 CFR Part 20 transportation regulations, extending the receipt notification window from 20 days to 45 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. This conclusion is based on several factors: (1) personnel in the vicinity of the LLW transportation package would receive no radiological dose resulting from the disposal container; (2) the LLW would remain secured in the transportation package until the package can be delivered to the waste disposal site; and (3) licensees provide oversight and monitoring of radioactive waste shipments throughout the entire journey from the nuclear facility to the disposal site. Therefore, the loss, misdirection, or diversion of a shipment without the knowledge of the licensee is unlikely.

7.5.2.2 Impacts on Licensees

Use of this option would have a positive impact on licensees because it would eliminate or reduce the need to request exemptions from the 10 CFR Part 20, Appendix G investigation, tracing, and reporting requirements for LLW transportation. These changes would represent a decreased burden to licensees and would add efficiency to the transport and disposal process.

7.5.2.3 Impacts on the NRC

Use of this option would have a positive impact on the use of NRC staff resources. The NRC staff would not need to divert resources from other agency activities to evaluate and approve each request. This option would have a small impact on the NRC staff because it would require the staff to promulgate rule language that is aligned with the exemptions that the NRC previously granted to licensees for the 10 CFR Part 20, Appendix G investigation, tracing, and reporting requirements for LLW transportation.

7.5.2.4 Additional Considerations

Use of this option would establish greater flexibility in the regulatory language related to the LLW investigation, tracing, and reporting requirements, leading to increased efficiency within the LLW transportation process. Efficiencies will be accomplished for both licensees and the NRC staff through the reduction or elimination of exemption requests.

7.5.2.5 Summary of Benefits and Costs

The reliance on exemptions creates uncertainties and regulatory burdens on licensees and the NRC staff. Under this option, 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 staff'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.

7.6 Backfitting and Issue Finality Considerations

Currently, the NRC does not expect that the recommended option in this section of the appendix would constitute backfitting under 10 CFR 50.109, 10 CFR 70.76, "Backfitting," or 10 CFR 72.62, "Backfitting," or violate any issue finality provision in 10 CFR Part 52. Option 1 would maintain the status quo of the current 10 CFR Part 20, Appendix G investigation, tracing, and reporting requirements for LLW transportation and for the need to seek specific exemptions to those requirements as needed. Option 2 would change the 10 CFR Part 20, Appendix G regulation to minimize the need for regulatory exemptions related to the investigation, tracing, and reporting requirements for LLW transportation from licensed facilities. These changes would not constitute backfitting as defined in 10 CFR 50.109, 10 CFR 70.76, or 10 CFR 72.62, or a violation of issue finality under 10 CFR Part 52. The new requirement under Option 2 would be a voluntary relaxation because licensees could still comply with the notification of receipt requirement within 20 days, as currently required. Further, the amendment would include a change to a reporting requirement, which is not within the purview of the NRC's backfitting or issue finality provisions.

7.7 Stakeholder Feedback on the Draft Regulatory Basis

7.7.1 Feedback from Rulemaking Public Meetings

The NRC held two public meetings, one on December 9, 2015, to discuss the ANPR, and another on May 8–10, 2017, to discuss the draft regulatory basis and preliminary draft regulatory analysis for a future rulemaking on decommissioning commercial nuclear power plants. During these meetings, the staff received feedback that, if the NRC staff intends to take a holistic look at the overall decommissioning process as part of this rulemaking activity, the agency should also consider addressing other exemptions needed during decommissioning, including those from the current investigation, tracing, and reporting requirements for LLW transportation contained in 10 CFR Part 20. The NRC considered these observations while preparing its recommendations in this appendix.

7.7.2 Main Themes from Public Comment Submissions

During the public comment period for the draft regulatory basis, as part of the more than 40 submissions received, the NRC received roughly 25 comment submissions directly related to Appendix H. Some commenters stated that rulemaking to change the LLW transportation investigation, tracing, and reporting requirements to more appropriately reflect the decommissioning process would represent an added efficiency to both the NRC and licensees. In addition, these stakeholders noted that, because all previous and current decommissioning licensees have requested exemptions in this area, rulemaking changes to codify these exemptions would increase regulatory efficiency for future decommissioning licensees.

7.7.3 NRC Response to Comments

In response to the comments received on the draft regulatory basis, the NRC staff has added a section to the regulatory basis to discuss the 10 CFR Part 20, Appendix G investigation, tracing, and reporting requirements for LLW transportation that are appropriate during operation and decommissioning at all nuclear facilities and to recommend rulemaking to change those requirements to extend the receipt notification window to 45 days after transferring LLW from the licensed facility. These changes increase regulatory efficiency and decrease burden in the application of the investigation tracing, and reporting requirements for LLW transportation during operation and decommissioning.

7.8 NRC Staff Recommended Approach

The NRC staff has determined that no public health or safety improvements would be gained by regulatory changes in this area. The NRC staff based this finding on its consideration of the SOC for the final rule associated with the investigation, tracing, and reporting requirements for LLW transportation, lessons learned, stakeholder comments on the ANPR and draft regulatory basis published for this rulemaking activity, other data that informed the current investigation, tracing, and reporting requirements for LLW transportation, and an assessment of the ongoing decommissioning activities currently taking place under these requirements (as exempted). Therefore, given the NRC's desire to maintain safety, reduce unnecessary regulatory burden, and improve efficiency and effectiveness in the regulatory process for both operating and decommissioning nuclear power plants, the NRC staff recommends Option 2 (Rulemaking to Change the Requirements of the Investigation, Tracing, and Reporting Timeframe for Low-Level Waste Transportation). This option would increase regulatory efficiency and decrease burden in the application of these requirements for LLW transportation during decommissioning and operation and at all licensed facilities while maintaining public health and safety. Although these changes would not significantly affect public health and safety, the increased flexibility of the requirements associated with the investigation requirements for LLW transportation would increase the overall efficiency of the regulatory process. In addition, by addressing this issue through rulemaking instead of continuing with the current approach of exemption requests, the time and resources expended by both the NRC staff and licensees would be reduced.

8 CLARIFYING THE SPENT FUEL MANAGEMENT REQUIREMENTS

8.1 Existing Regulatory Framework

8.1.1 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[23]" 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 SFP(s) 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; 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 NRC's 10 CFR Part 50 license for the site has been reduced to an area that only encompasses the ISFSI facility. 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.

Accordingly, the requirements of any rulemaking recommended by this regulatory basis 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. Any requirements recommended by this regulatory basis or implemented in the subsequent rulemaking activity that would apply to a standalone ISFSI/Decommissioned Reactor site would be consistent with the licensing actions that the NRC has already approved for that licensee.

In addition, the requirements of this rulemaking would not apply to ISFSI-only sites to the extent that their NRC-approved licensing bases have already been changed to reflect the reduced radiological risks remaining at the site (e.g., reduction of emergency preparedness, security, and insurance requirements; adoption of ISFSI-only technical specifications). During the proposed rule phase, the NRC staff will further examine the specific implementation issues

[23] Given that the public comments referred to "standalone ISFSIs," this regulatory basis uses that same terminology. However, in accordance with IMC 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."

associated with this rulemaking to ensure that there are no unintended consequences to ISFSI-only or standalone ISFSI/Decommissioned Reactor sites.

8.1.2 Spent Fuel Management Requirements in 10 CFR 72.218

The NRC staff found that the cross-references between the spent fuel management requirements in 10 CFR 72.218, 10 CFR 50.54(bb), 10 CFR 50.82, and 10 CFR 52.110 need to be clarified. Specifically, 10 CFR 72.218(a) notes that the 10 CFR 50.54(bb) spent fuel management program must include a plan for removal from the reactor site of the spent fuel stored under the general license. The plan 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. The requirement in 10 CFR 72.218(b) notes that an application for termination of a reactor operating license submitted under 10 CFR 50.82 or 10 CFR 52.110 must also describe how the spent fuel stored under the general license will be removed from the reactor site. Although 10 CFR 72.218 states what information the 10 CFR 50.54(bb) spent fuel management program and the 10 CFR 50.82 and 10 CFR 52.110 application for termination of a reactor operating license must include, 10 CFR 50.54(bb), 10 CFR 50.82, and 10 CFR 52.110 do not contain this information. The NRC first issued 10 CFR 72.218 with the ISFSI general license rulemaking ("Storage of Spent Fuel in NRC-Approved Storage Casks at Power Reactor Sites") on July 18, 1990 (55 FR 29181), and it only applies to general ISFSI licensees.

8.1.3 Irradiated Fuel Management Program in 10 CFR 50.54(bb)

The requirement in 10 CFR 72.218(a) notes that the 10 CFR 50.54(bb) spent fuel management program must include a plan for removal of the spent fuel stored under the general license from the reactor site. According to 10 CFR 72.218(a), the plan must show how the licensee will manage spent fuel before starting to decommission systems and components needed for moving, unloading, and shipping this spent fuel. The requirements in 10 CFR 50.54(bb), however, only direct licensees (either 5 years before license expiration or 2 years following shutdown, whichever comes first) to submit for NRC "review and preliminary approval" their program for the management of spent fuel, including the provision of funding, until DOE takes title to, and possession of, the spent nuclear fuel. The requirement in 10 CFR 50.54(bb) does not require the specific information identified in 10 CFR 72.218(a) to be included in the plan – namely, a plan for removal of the spent fuel from the reactor site, showing how the spent fuel will be managed before decommissioning systems and components needed to move, unload, and ship the spent fuel from the facility.

8.1.4 Application for Termination of Reactor License in 10 CFR 50.82 and 10 CFR 52.110

The issuance of 10 CFR 72.218 in 1990 predated the 1996 decommissioning rulemaking. Before 1996, the reactor decommissioning regulations required a licensee to submit a detailed DP before the licensee could begin dismantlement or any major decommissioning activities. As such, the requirement in 10 CFR 72.218(b) for "an application for termination of a reactor operating license" is intended to describe a detailed DP. In the 1989 ISFSI general license proposed rule SOC, the Commission stated that the DP "must show how the spent fuel stored under this general license will be removed from the site. The plan would have to include an explanation of when and how the spent fuel will be moved, unloaded, and shipped prior to starting decommissioning of the equipment needed for these activities."

The NRC added a new requirement in 1996 that a PSDAR must be submitted before or within 2 years following permanent cessation of operations, and that an LTP must be submitted

2 years before license termination for the agency's review and approval. However, by the time of LTP submittal, most of the 10 CFR Part 50 or 10 CFR Part 52 facilities may have already been dismantled under 10 CFR 50.59, and the LTP may consist of only a dose assessment and a final status survey plan to demonstrate that the residual radioactivity that remains on site meets the dose limits for license termination and site release.

The Commission recognized this in the 1996 final rule SOC (61 FR 39280):

> A licensee wishing to terminate its license would submit a license termination plan for approval similar to the approach that is currently required for a decommissioning plan. However, the plan would be less detailed than the decommissioning plan required by the current rule, because it would not need to provide a dismantlement plan, and could be as simple as a final site survey plan.

Thus, the 10 CFR 72.218(b) reference to the 10 CFR 50.82 and 10 CFR 52.110 application for termination of a reactor operating license (that must describe how the spent fuel stored under the general license will be removed from the reactor site) was intended to apply to the detailed DP that was (before 1996) required to be submitted to the NRC for review and approval.

However, after the 1996 decommissioning final rule, the NRC no longer requires a detailed DP for dismantlement and decommissioning, and thus, there is no requirement as specified in 10 CFR 72.218(b) for the licensee to consider and document, or for the NRC to review and approve, how to manage and remove the spent fuel off site before decommissioning the SSCs that support moving, unloading, and shipping spent fuel. Following the 1996 rulemaking, the 10 CFR 72.218(b) reference to 10 CFR 50.82 and 10 CFR 52.110 refers primarily to the LTP. As noted above, by the time the licensee submits the LTP, it may have already decommissioned the entire 10 CFR Part 50 or 10 CFR Part 52 facility, including any support facilities for moving, unloading, and shipping spent fuel. The SOC for the 1996 final rule discussed a relevant comment on the 1995 proposed rule (61 FR 39292):

> Comment. Several individual commenters wanted to know whether NRC rules allow the optional period of storage of the reactor facility to be longer than 60 years and does the 60-year completion date for decommissioning specified in the current rule consider storage of fuel in an [ISFSI]. One commenter stressed that spent fuel should not be separated from any of the phases of decommissioning because this is a piecemeal approach and inappropriate. Another commenter stated that the licensee should be required to maintain capability to handle the fuel for dry cask storage.
>
> Response. The primary considerations of the proposed rule were procedural, with emphasis on the issue of premature closure. Other aspects of the existing rule were unchanged. A 60-year period for completion of decommissioning is still imposed, subject to other considerations delineated in the current rule requirements. The existing rule, as well as the proposed rule, consider the storage and maintenance of spent fuel as an operational consideration and provide separate 10 CFR Part 50 requirements for this purpose. Regarding maintaining the capability to handle the fuel for dry cask storage, these requirements are maintained in 10 CFR Part 72.

This blanket reference to 10 CFR Part 72 in the 1996 SOC does not specifically cite 10 CFR 72.218, but 10 CFR 72.218 is the most relevant reference for fuel handling or unloading

capability. The NRC staff concludes that the original reference from 10 CFR 72.218(b) to 10 CFR 50.82 (at the time of the 1990 issuance of 10 CFR 72.218) was appropriate, given the reactor decommissioning framework at that time. However, after the 1996 reactor decommissioning rulemaking, this reference is no longer effective as 10 CFR 50.82 does not explicitly require a licensee to consider how it will manage spent fuel at the site before it decommissions the SSCs that support moving, unloading, and shipping spent fuel.

8.2 Regulatory and Rulemaking Options

The NRC staff examined whether the regulatory or technical bases for any of the above statements regarding spent fuel management requirements have changed since the issuance of the 1988, 1990, and 1996 rules discussed above, or as a result of experiences or lessons learned during previous decommissioning activities. The NRC staff explored the opportunity to incorporate additional enhancements or overall improvements into the regulatory process for spent fuel management, such as guidance revisions or development, to ensure (1) that licensees undergoing the decommissioning process are taking adequate actions to maintain the appropriate systems and capabilities for spent fuel management and handling, (2) regulatory clarity, and (3) efficiency, transparency, and openness in the decommissioning process.

The NRC considered and evaluated three options: (1) no action, (2) guidance development or enhancement, and (3) rulemaking to clarify the spent fuel management requirements. In its evaluation of the options, the staff considered the stakeholder comments received on the ANPR and draft regulatory basis published for this rulemaking activity. Some stakeholders supported the no-action option because guidance or rulemaking changes in this area will not increase public health and safety or substantially improve efficiency. Other stakeholders supported the guidance or rulemaking changes because these options would increase transparency and clarity in the decommissioning process for all stakeholders, including State and local communities. Some stakeholders stated that the current requirements in 10 CFR 72.218 for licensees to have a plan for removal of spent fuel from the site are not necessary, as this is the role of DOE. A description and the NRC staff's assessment of each option follow.

8.2.1 Option 1—No Action

8.2.1.1 Description of Option 1

The no-action option 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 50.54(bb), 10 CFR 50.82, 10 CFR 52.110, or 10 CFR 72.218.

8.2.1.2 Assessment of Option 1

Based on lessons learned and the experience from previously decommissioned reactors, as well as the numerous reactor facilities that currently operate onsite ISFSIs, there is no indication that the lack of cross-referencing between 10 CFR 72.218, 10 CFR 50.54(bb), 10 CFR 50.82, and 10 CFR 52.110 impacts public health, safety, or security in terms of spent fuel management and decommissioning. In addition, the NRC staff notes that most licensees have already undertaken the spent fuel management planning envisioned by 10 CFR 72.218 to some degree, whether it is through use of dry casks that have associated transportation certificates; operating the ISFSI in accordance with the approved design bases and technical specifications for the dry cask systems, including maintaining SSCs relied upon for ready retrieval of spent fuel; or

contingencies addressing the potential need to replace casks or other spent fuel storage components before the end of ISFSI operations. As such, changes to the current regulatory requirements in this area could have limited additional benefit. Furthermore, opting not to make any changes to the current regulatory requirements would have no additional impact on future plants intending to transition to a decommissioning status. However, maintaining the status quo would leave a potential ambiguity in the regulations given the lack of cross referencing between 10 CFR Part 72 and 10 CFR Part 50.

8.2.2 Option 2—Guidance Development or Enhancement

8.2.2.1 Description of Option 2

In this option, the NRC staff would update or create guidance documents to expressly address the need for decommissioning licensees to consider or plan how to manage spent fuel at the site before they decommission the SSCs that support moving, unloading, and shipping of spent fuel. Specifically, RG 1.184, RG 1.185, or both, would be updated to include a discussion of best practices for creating a spent fuel management plan that addresses the potential need for fuel handling after the facility has entered the decommissioning and dismantlement process. In order to increase transparency in the decommissioning process, guidance would be provided to licensees regarding the need for additional detail in the decommissioning documents to discuss any plans to address the potential need to handle the spent fuel while it is in dry storage, whether it be as part of a future maintenance activity, to address a concern with the storage system itself, or to promote future permanent removal of the spent fuel from the reactor site.

8.2.2.2 Assessment of Option 2

Some stakeholders have a perception that licensees at decommissioning facilities are not appropriately considering long-term planning for the management of spent fuel in dry storage, especially as this planning information is not readily accessible to external stakeholders. This option would address this issue and improve transparency and stakeholder access to spent fuel management information without the need to further formalize decommissioning document content in NRC regulations. This option would continue to provide the flexibility needed by many decommissioning sites in various stages of the process, as well as help maintain adequate protection of public health and safety throughout decommissioning. As most licensees tend to use these documents as the roadmap for assembling decommissioning documents to be submitted to the NRC, appropriate guidance updates could lead to an overall enhancement of these documents, including an improved overall discussion of spent fuel management, resulting in more transparency during the decommissioning process.

This option would provide additional guidance and an enhanced level of detail for the decommissioning documents that address the management of spent fuel at the site before the SSCs that support moving, unloading, and shipping spent fuel have been decommissioned and dismantled. To prepare appropriate technical specifications for ISFSIs or cask designs, the NRC staff already evaluates, and the applicants already assess, ready retrieval of spent fuel and the potential need to handle spent fuel while it is in dry storage. These evaluations are generally available in ISFSI or cask design bases documents. As such, decommissioning licensees would be able to reference this information in the decommissioning documents in order to enhance the discussion of spent fuel management. The discussion could include the plan for ongoing security, emergency planning, staffing, and funding at the ISFSI, and contingencies addressing the potential need to replace casks or other spent fuel storage components before the end of operation of the ISFSIs.

The guidance development process would include stakeholder participation to determine the appropriate level of planning in terms of (1) physical, programmatic, and procedural infrastructure, and (2) contingency planning, such as obtaining necessary technical expertise or capabilities, if needed, for potential future inspection, maintenance, repair, aging management activities, and corrective actions. The planning would reflect the ISFSI design bases, including the infrastructure in place for ready retrieval of spent fuel. It would also reflect the ISFSI storage term, including any aging management considerations for ISFSIs in the period of extended operation. In addition, the planning would reflect the spent fuel storage duration, given the uncertainty in the national policy for the disposal of spent fuel.

8.2.3 Option 3—Rulemaking to Clarify Spent Fuel Management Requirements and Decommissioning Documentation

8.2.3.1 Description of Option 3

In this option, the NRC staff would pursue rulemaking to clarify and update the regulations in 10 CFR 50.54(bb), 10 CFR 50.82, 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 spent fuel at the site before it decommissions the structures, systems, and components that support moving, unloading, and shipping of spent fuel. Specifically, language would be added to 10 CFR 50.54(bb), 10 CFR 50.82(a)(4), or 10 CFR 52.110(d), or a combination thereof, to align with the existing requirements in 10 CFR 72.218 that the IFMP or PSDAR describe how the licensee will manage spent fuel at the site before it starts to decommission systems and components needed for moving, unloading, and shipping the spent fuel. In addition, the NRC could clarify the language in 10 CFR 72.218(b) to refer to the PSDAR, rather than the LTP, during the decommissioning process. The agency could also modify the language in 10 CFR 72.218 to remove the specific reference to a plan for removal of the spent fuel from the site and instead focus on the safe management of spent fuel at the site until title to, and possession of, the fuel is transferred to DOE. Alternatively, the NRC could delete 10 CFR 72.218 when it adds the spent fuel management planning requirements to 10 CFR Part 50.

8.2.3.2 Assessment of Option 3

The NRC staff evaluated the regulatory language in 10 CFR 50.54(bb), 10 CFR 50.82, 10 CFR 52.110, and 10 CFR 72.218 as they relate to requirements for a licensee to consider how it will manage spent fuel at the site before it decommissions the SSCs that support moving, unloading, and shipping spent fuel. As a result of this evaluation, the NRC staff determined that, as 10 CFR 50.54(bb), 10 CFR 50.82, and 10 CFR 52.110 do not reflect the provisions in 10 CFR 72.218, this may cause regulatory uncertainty. Adding the specific provisions from 10 CFR 72.218 to 10 CFR 50.54(bb), 10 CFR 50.82, 10 CFR 52.110 (or a combination thereof), as outlined above, would provide regulatory clarity and enhance overall regulatory transparency and openness with minimal burden on licensees.

After consideration of the stakeholder comments on the draft regulatory basis created for this rulemaking activity, the NRC staff determined that the language in 10 CFR 72.218 requiring licensees to have a plan for removal of the spent fuel from the site is not necessary because fuel removal is contingent upon a national policy for the final disposition of spent fuel and is beyond the control of the licensee. Accordingly, the staff determined that the rule should more appropriately require the licensee's plans to safely manage spent fuel at the ISFSI site until DOE takes title to, and possession of, the spent fuel. In addition, as this rulemaking option

would include the development of implementing guidance, the assessment in Option 2 of this section for guidance development or enhancement would also apply to this rulemaking option.

8.3 Regulatory Scope

The NRC would amend the regulations to require that the decommissioning documents described in 10 CFR 50.54(bb), 10 CFR 50.82, or 10 CFR 52.110 (i.e., the PSDAR, IFMP, or both) (or a combination of these regulations) contain information on spent fuel management planning, in accordance with the regulatory requirements in 10 CFR 72.218.

8.4 NRC Guidance, Policy, and Implementation Issues

The NRC staff would revise RG 1.184, Revision 1, RG 1.185, Revision 1, or both to reflect the changes described in Option 2 and Option 3 of this section.

8.5 Impacts on Public Health, Safety, and Security

8.5.1 Option 1—No Action

The no-action option would retain the provisions of the current decommissioning regulations and guidance documents for spent fuel management and handling capabilities during decommissioning and would make no changes or clarifications to the requirements in 10 CFR 50.54(bb), 10 CFR 50.82, 10 CFR 52.110, or 10 CFR 72.218.

8.5.1.1 Impacts on Public Health, Safety, and Security

Maintaining the status quo will have no impact on public health, safety, and security because most licensees have already undertaken the spent fuel management planning envisioned by 10 CFR 72.218 to some degree and are implementing the associated regulations.

8.5.1.2 Impacts on Licensees

Use of this option would have no impact on licensees because the level of effort and associated burdens related to the spent fuel management requirements under the current regulatory framework will be unchanged.

8.5.1.3 Impacts on the NRC

Use of this option would have no impact on the NRC staff because the level of effort and associated burdens related to the understanding and review of spent fuel management requirements under the current regulatory framework will be unchanged. Taking no action will also eliminate staff time dedicated to the rulemaking process.

8.5.1.4 Additional Considerations

The level of effort and associated burdens on both licensees and the NRC staff related to the response to public and stakeholder inquiries on the spent fuel management process at decommissioning power reactors is a potential consideration in making changes to the level of detail provided in the decommissioning documents regarding spent fuel management.

8.5.1.5 Summary of Benefits and Costs

Maintaining the provisions of the current decommissioning regulations and guidance documents for spent fuel management and handling capabilities during decommissioning has no impact on the protection of public health and safety and no additional impact on the NRC or licensees in the decommissioning process.

8.5.2 Option 2—Guidance Development or Enhancement

Under this option, the NRC staff would update RG 1.184, Revision 1, RG 1.185, Revision 1, or both, to discuss best practices for creating a spent fuel management plan that addresses the potential need for fuel handling after the facility has entered the decommissioning process. The NRC would publish the updated guidance as draft RG 1.184, Revision 2, and draft RG 1.185, Revision 2, for public review and comment before finalizing the documents.

8.5.2.1 Impacts on Public Health, Safety, and Security

The guidance updates would maintain the current level of public health, safety, and security, increase the level of transparency and clarity in the spent fuel management requirements, and promote a greater understanding by the general public and other stakeholders of the overall decommissioning process.

8.5.2.2 Impacts on Licensees

Use of this option would have a small impact on decommissioning licensees and other stakeholders that would be involved in the guidance development process because it would potentially increase the level of detail in the documentation provided in the PSDAR, IFMP, or both for licensees that choose to implement the guidance. The updates to the guidance documents would reflect additional details related to activities licensees are currently undertaking in planning for spent fuel management and dry cask storage systems in accordance with 10 CFR Part 72 and requirements for decommissioning documents. While these changes would represent a minimally increased burden on licensees since they reflect information captured in other spent fuel documentation, they would also increase awareness of the decommissioning process among the NRC staff, members of the public, and other stakeholders.

8.5.2.3 Impacts on the NRC

Use of this option would have a small-to-moderate impact on the NRC staff because it would require an update to RG 1.184, Revision 1, RG 1.185, Revision 1, or both, and additional staff resources would be needed to review a potentially expanded level of detail in the PSDARs and IFMPs. Although the NRC would need to expend additional resources in the near term to develop the guidance in RG 1.184 and RG 1.185, both the NRC and licensees would eventually save resources because the additional information provided would result in a more streamlined and predictable process that minimizes the need for additional regulatory interactions related to the PSDAR or IFMP, and could reduce the number of stakeholder inquiries received on these documents. Further, such clarified guidance would help the NRC better plan resource needs for future decommissioning reviews. Also, this option would result in a greater level of overall regulatory transparency and openness in the NRC's decommissioning process for external stakeholders, which would offset this increased burden. Finally, this option would reduce the

need of the NRC staff to have to request the submission of additional information after that PSDAR or IFMP have been submitted.

8.5.2.4 Additional Considerations

The increased level of detail in the guidance under this option would reduce the NRC staff's need to engage in site-specific interactions with the licensee to clarify information on the management of spent fuel during decommissioning, thus enhancing efficiency in the NRC's oversight of the decommissioning process. This option would reduce the NRC staff's time in responding to stakeholder inquiries in this area, thereby improving efficiency. In addition, the recommended updates would add clarity and consistency to the guidance. These recommended changes would also apply the principles of good regulation: independence, clarity, openness, reliability, and efficiency.

8.5.2.5 Summary of Benefits and Costs

Use of this option will increase the level of detail in the decommissioning documents, leading to a better understanding of the decommissioning process by all stakeholders. This recommendation will maintain the current level of public health, safety, and security, and it will increase the level of transparency and promote a greater understanding by the general public. The increased level of detail in the guidance under this option would reduce or eliminate the NRC staff's site-specific interactions with the licensee to clarify information on the management of spent fuel during decommissioning, thus enhancing the NRC's oversight of the decommissioning process. This option would also reduce the NRC staff's time in responding to frequent stakeholder inquiries in this area, improving efficiency and transparency. Finally, this option would enhance the opportunities for public and other stakeholder access to information in the decommissioning process, as well as expand overall regulatory transparency and openness.

8.5.3 Option 3—Rulemaking to Clarify Spent Fuel Management Requirements and Decommissioning Documentation

In this option, the NRC staff would pursue rulemaking to clarify and update the regulations in 10 CFR 50.54(bb), 10 CFR 50.82, 10 CFR 52.110, and 10 CFR 72.218 on requirements for a licensee to consider or plan how it will manage spent fuel at the site before it decommissions the SSCs that support moving, unloading, and shipping spent fuel.

8.5.3.1 Impacts on Public Health, Safety, and Security

The recommended rulemaking change would maintain the current level of public health, safety, and security, increase the level of transparency and clarity, and promote a greater understanding by the public and other stakeholders of the spent fuel management process.

8.5.3.2 Impacts on Licensees

Use of this option would have a small impact on the decommissioning licensees because their efforts in preparing the decommissioning documents would increase slightly since a small additional amount of time and effort would be necessary to provide the additional level of detail and information in the decommissioning documents related to spent fuel management and handling capabilities during decommissioning. This effort is expected to be minimal since licensees are already required to have spent fuel management plans per 10 CFR 72.218. While these changes would have no direct impact on public health and safety, the increased clarity of

the requirements associated with planning for spent fuel management and handling during decommissioning would enhance the planning information available to the NRC and stakeholders on the management of spent fuel and would increase the overall transparency of the decommissioning process.

8.5.3.3 Impacts on the NRC

Use of this option would have a small impact on the NRC staff because it would require the staff to (1) use rule language that is mostly already present in other sections of 10 CFR Chapter I and simply move it into 10 CFR 50.54(bb), 10 CFR 50.82, 10 CFR 52.110, or a combination thereof and (2) either revise the language in 10 CFR 72.218 to require a plan to manage the spent fuel at the ISFSI and no longer require a plan for removal of the spent fuel from the site, or delete the 10 CFR 72.218 provision once it is added to 10 CFR Part 50. While these changes would have no direct impact on public health and safety, the increased clarity of the requirements associated with planning for spent fuel management and handling during decommissioning would enhance the information available to the NRC and stakeholders on managing spent fuel and would increase the transparency of the decommissioning process.

8.5.3.4 Additional Considerations

The recommended rulemaking changes would apply the principles of good regulation: independence, clarity, openness, reliability, and efficiency.

8.5.3.5 Summary of Benefits and Costs

Use of this option will increase the level of detail in the decommissioning documents related to spent fuel management planning during decommissioning, leading to a better understanding of the decommissioning process by all stakeholders. This recommendation will maintain the current level of public health, safety, and security, and it will increase the level of transparency and promote a greater understanding by the general public.

8.6 Backfitting and Issue Finality Considerations

Option 1 would maintain the status quo of the current decommissioning regulations and guidance documents regarding the NRC's expectations for spent fuel management requirements during the decommissioning process. Option 2 would establish guidance on providing an additional level of detail in the decommissioning documents for licensees considering how to manage spent fuel at the site before they decommission the SSCs that support moving, unloading, and shipping spent fuel. Option 3 would implement rulemaking to clarify and update the regulations in 10 CFR 50.54(bb), 10 CFR 50.82, 10 CFR 52.110, and 10 CFR 72.218 in regard to cross-referencing the requirements for a licensee to consider how it will manage spent fuel at the site before it decommissions the SSCs that support moving, unloading, and shipping spent fuel. These changes would not constitute backfitting as defined in 10 CFR 50.109 or a violation of issue finality under 10 CFR Part 52 because reporting requirements are not covered by the NRC's backfitting regulations.

8.7 Stakeholder Feedback on Draft Regulatory Basis

8.7.1 Feedback from Rulemaking Public Meetings

The NRC held two public meetings, one on December 9, 2015, to discuss the ANPR, and another on May 8–10, 2017, to discuss the draft regulatory basis and preliminary draft regulatory analysis for a rulemaking on decommissioning commercial nuclear power plants. During these meetings, the NRC staff received feedback from some commenters that supported the no-action option because the guidance or rulemaking changes in this area would not increase public health and safety or substantially improve efficiency. Commenters supported the guidance updates or rulemaking changes because these options would increase transparency in the decommissioning process for all stakeholders, including State and local communities. Some commenters expressed that the requirements in 10 CFR 72.218 for licensees to have a plan for removal of spent fuel from the site are not necessary, as this is the role of DOE. The NRC staff considered these observations in preparing its recommendations in this appendix.

8.7.2 Main Themes from Public Comment Submissions

During the public comment period for the draft regulatory basis, as part of the more than 40 submissions received, the NRC received roughly 25 comment submissions directly related to Appendix H. Some commenters stated that 10 CFR 72.122(l) already requires spent fuel storage systems to be designed to allow ready retrieval of spent fuel, high-level radioactive waste, and reactor-related greater than Class C waste for further processing or disposal. Therefore, the need for a decommissioning licensee to consider or plan how it is going to manage spent fuel at the site before it decommissions the SSCs that support moving, unloading, and shipping of spent fuel is already a built in requirement of the NRC's approval of Part 72 ISFSI licenses. As such, an additional review or requirements to address this issue via the current decommissioning rulemaking activity is not needed. Some commenters argued that the existing regulations in 10 CFR Part 72 ensure safe storage of spent fuel both during the initial storage period and after operation.

Multiple commenters supported the transfer of spent fuel from storage in the SFPs to storage in an onsite ISFSI as soon as technically possible after a facility enters decommissioning and requested that the NRC consider making expedited fuel transfer to dry storage a regulatory requirement. These commenters also argued that there is a need for a detailed long-term waste storage timeline including long-term disposal. Some commenters supported the guidance or rulemaking changes, noting it would increase transparency in the decommissioning process.

8.7.3 NRC Response to Comments

In response to the comments received on the draft regulatory basis, the NRC staff has modified its recommended revisions to the regulations in 10 CFR Part 72 and 10 CFR Part 50 and is proposing to clarify the scope of the rule. Specifically, the staff would modify the language in 10 CFR 72.218 to eliminate the specific reference to a plan for removal of the spent fuel from the site and instead focus on the safe management of spent fuel at the site until title to, and possession of, the fuel is transferred to DOE, or choose to delete 10 CFR 72.218 once the NRC has added the spent fuel management planning requirements to 10 CFR Part 50. In response to comments, the NRC staff is also proposing to clarify the applicability of the rule to "ISFSI-only" and "standalone ISFSI/Decommissioned Reactor" sites.

Finally, during its review of the lessons learned from previously decommissioned power reactors, the NRC staff noted that most of the plants that have recently entered decommissioning have opted to begin moving their spent fuel into dry storage early in the decommissioning process. Although the NRC has concluded, in numerous spent fuel and waste confidence studies (see Section 2.2, "Power Reactor Decommissioning Activity Since the 1996 Decommissioning Rule," of this regulatory basis), that spent fuel storage in dry or wet conditions is protective of public health and safety and the environment, this decision by decommissioning licensees can expedite the overall decommissioning timeframe because the remainder of the plant is largely prepared for decontamination and dismantlement once the spent fuel is removed from the pools. Because the licensees currently have the option to move the fuel early, additional regulations in this area would decrease the flexibility envisioned by the 1996 decommissioning rule without a commensurate increase in public health and safety.

8.8 NRC Staff Recommended Approach

No additional public health or safety improvements appear to be gained by further regulatory changes in this area. The NRC staff based this finding on an evaluation of the 1996 SOC, lessons learned, stakeholder comments on the ANPR and draft regulatory basis published for this rulemaking activity, and other information that informed previous decommissioning rulemaking and guidance activities on spent fuel management and handling capabilities during decommissioning, as well as on an assessment of the ongoing decommissioning activities taking place under the current requirements. However, given the NRC staff's desire to maintain safety; reduce regulatory uncertainty; and improve efficiency, effectiveness, clarity and transparency in the regulatory process for decommissioning nuclear power plants, the NRC staff recommends the use of Option 3 (Rulemaking to Clarify the Spent Fuel Management Requirements) to address this issue. The rulemaking process will include revising the associated guidance documents as outlined in Option 2 (Guidance Development or Enhancement) of this section. This option will provide additional regulatory clarity without reducing the flexibility provided by the current decommissioning regulations or imposing unnecessary burdens on licensees or the NRC staff.

9 CONCLUSIONS

In conducting its Commission-directed evaluation of the power reactor decommissioning process, the NRC staff used precedent from earlier decommissioning rulemakings, the SOCs for those rules, and the technical basis documents (such as NUREGs, RGs, and Commission papers) that supported the final rules, as well as general lessons learned from previous decommissioning activities that remain applicable today.
The NRC staff also reviewed:

- industry and NRC reports created to document the decommissioning process at several power reactors that have had their licenses terminated under the pre-1996 decommissioning regulations (e.g., Yankee Rowe and Trojan);

- a series of technical reports created by EPRI to discuss decommissioning experiences;

- the decommissioning information and licensing documents generated to support facilities that have achieved or are nearing license termination under the current regulations;

- the existing NUREGs and other technical documents that form the basis for the current decommissioning process and its timeline;

- lessons learned from the plants that recently entered decommissioning; and

- the public comments received on the ANPR and draft regulatory basis produced for this rulemaking activity.

The NRC staff examined these documents to determine which technical and regulatory bases and conclusions are still applicable, which may need to be updated, and which could be improved given the lessons learned since the last update of the decommissioning regulations.

Based on its evaluation of the above documents and the ongoing implementation of the decommissioning regulations promulgated by the 1988 and 1996 rules, the NRC staff concluded that the current decommissioning regulations with respect to four of the subjects of this appendix—the level of PSDAR review by the NRC, maintaining the decommissioning options, the timeframe associated with decommissioning, and the role of external stakeholders in the decommissioning process—are sufficient to protect public health and safety because the underlying technical conclusions that support the regulations have not substantially changed. Specifically, the NRC staff determined that the previous conclusions in areas such as the overall source term present at the sites, the volume of radiological waste produced during decommissioning, the time necessary for radiation to decay to a certain level, and the overall costs associated with decontamination and dismantlement have remained valid for facilities undergoing decommissioning since the 1996 rule change.

In addition, current experience with decommissioning facilities indicates that the overall process is being implemented in a manner that is consistent with the intent of both the 1988 and 1996 rules. Namely, the staff has found that decommissioning will be accomplished in a safe and timely manner, and that adequate funds will be available for this purpose. As discussed throughout this appendix, in general, while the NRC staff has concluded that it does not have a basis to significantly change the current decommissioning framework or associated process and policies, it can incorporate improvements where appropriate. The primary improvements involve providing updated and more detailed guidance to licensees to assist in the decommissioning process and by implementing rulemaking changes for specific issues to either reduce regulatory burden based on the decreased risk at the decommissioning plant or clarify existing regulations (e.g., recordkeeping and record retention requirements, LLW transportation investigation requirements, consideration of environmental impacts in the PSDAR, and clarification of the spent fuel management requirements).

APPENDIX I
APPLICATION OF THE BACKFIT RULE

CONTENTS

1 INTRODUCTION

The U.S. Nuclear Regulatory Commission (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.[24]

For nuclear power reactor licensees, this process is set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.109, "Backfitting," and in the issue finality provisions in 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants" (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 follows:

> [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," dated November 4, 1998 (Agencywide Documents Access and Management System (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."

[24] "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors; Final Rule," *Federal Register*, Vol. 54, No. 73, April 18, 1989, pp. 15385–15386.

- 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 Statements of Consideration for the 1970[25], 1985[26], and 1988[27] 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]."

- The 1996 decommissioning final rule[28] did not directly respond to questions from the public on the applicability of the Backfit Rule to a decommissioning plant.

The NRC staff plans to address this uncertainty in this rulemaking.

2 EXISTING REGULATORY FRAMEWORK

In SECY-98-253, the NRC staff requested Commission approval to amend 10 CFR 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, staff requirements memorandum (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 ordered the development of a rulemaking plan, which became SECY-00-145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," dated June 28, 2000 (ADAMS Accession No. ML003721626). In SECY-00-0145, the NRC staff proposed, among other decommissioning-related amendments to its regulations, amendments to 10 CFR 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 Section 2.2, "Power Reactor Decommissioning Activity since the 1996 Decommissioning Rule," of the regulatory basis, the NRC did not conduct that rulemaking. Therefore, the NRC applies the Backfit Rule to licensee facilities undergoing decommissioning to the extent practical.

[25] 35 FR 5317, March 31, 1970

[26] 50 FR 38097, September 20, 1985

[27] 53 FR 20603, June 6, 1988

[28] 61 FR 39278, July 29, 1996

3 TECHNICAL BASIS FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

The NRC's regulatory framework supports application of the Backfit Rule to power reactor licensees in decommissioning.

Under sections 101 and 103a. of the Atomic Energy Act of 1954, as amended (AEA) (42 U.S.C. 2131 and 2133a.), the NRC's issuance of a power reactor operating license under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," 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 removal of fuel from the reactor vessel and the NRC dockets those certifications, the licensee is no longer authorized to operate the reactor under 10 CFR 50.82(a)(2) or 10 CFR 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 10 CFR 50.51(b) for 10 CFR Part 50 licenses and 10 CFR 52.109, "Continuation of combined licenses," for 10 CFR Part 52 combined licenses, when the reactor has permanently ceased operations, the license "continues in effect beyond the expiration date to authorize ownership and possession of the production or utilization 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 52 facility license.

Although the 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 systems, structures, and components (SSCs) at the site. Under 10 CFR 50.51(b), when the licensee has only a possession and ownership license for the reactor, the licensee must do the following:[29]

> (1) Take actions necessary to decommission and decontaminate the facility and continue to maintain the facility, including, where applicable, the storage, control and maintenance of the spent fuel, in a safe condition, and
>
> (2) Conduct activities in accordance with all other restrictions applicable to the facility in accordance with the NRC regulations and the provisions of the specific 10 CFR part 50 license for the facility.

As expressed in 10 CFR 50.51(b), "maintaining the facility" once reactor operations permanently cease includes not only maintaining the reactor but also "the storage, control and maintenance of the spent fuel, in a safe condition." Power reactor licensees currently store, control, and maintain spent fuel after permanent cessation of reactor operations through the operation of a spent fuel pool and independent spent fuel storage installation.

Although 10 CFR 50.109(a)(1) defines "backfitting" as "the modification of or addition to…the procedures or organization required to design, construct or operate a facility…," indicating that

[29] The regulation at 10 CFR 52.109 contains almost identical requirements. The only difference is in the second numbered paragraph, which references the provisions of the combined license for the facility instead of the provisions of the 10 CFR Part 50 license for the facility referenced in 10 CFR 50.51(b)(2).

the Backfit Rule applies only to a holder of a license to "operate a facility," the language of 10 CFR 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 protects a licensee that has a license to possess and own a facility—but not to operate the facility because the reactor has permanently ceased operations—because the words "operate a facility" in 10 CFR 50.109(a)(1) can be read to encompass operating not just the reactor but also the spent fuel pool and associated SSCs necessary for compliance with 10 CFR 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, Backfit Rule 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. The NRC has the opportunity now to resolve the issues identified in SECY-98-253 and to clarify the regulatory language on the application of the Backfit Rule to power reactor licensees during decommissioning.

4 RULEMAKING OPTIONS

The NRC considered three options for applying the Backfit Rule to licensees in decommissioning: (1) applying the current Backfit Rule to the extent practical, (2) issuing new or revised guidance, and (3) conducting rulemaking. These options are discussed below.

4.1 Option 1: No Action

4.1.1 Description of Option 1

The NRC could 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), addressing 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), addressing the potential safety impact of changes in plant or operational complexity, including the relationship to proposed and existing regulatory requirements
- other references to reactor design, construction, or operation in 10 CFR 50.109

4.1.2 Assessment of Option 1

The approach described in Option 1 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 staff 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.

4.2 Option 2: Guidance Development

4.2.1 Description of Option 2

The NRC's primary guidance document for licensees and other external stakeholders in the area of backfitting is NUREG-1409, "Backfitting Guidelines" dated July 31, 1990 (ADAMS Accession No. ML032230247). This document describes the types of backfits, how backfitting determinations are made and justified, how generic and facility-specific backfits are imposed, and the appeal process. The NRC issued this NUREG before the Commission made significant changes to its regulations on issue finality and the application of backfitting provisions to nonreactor licensees such as spent fuel storage installations and fuel cycle facilities. The primary guidance on backfitting for the NRC staff is found in Management Directive 8.4, "Managememnt of Facility-Specific Backfitting and Information Collection" (ADAMS Accession No. ML12059A460).

Updates to the guidance documents on backfitting are currently underway based on recent direction to the NRC staff. In a 2016 memorandum, "Tasking Related to Implementation of Agency Backfitting and Issue Finality Guidance," the NRC's Executive Director for Operations tasked the NRC staff to assess the adequacy and currency of the NRC's existing backfitting requirements, guidance, criteria, and procedures, including NUREG-1409 (ADAMS Accession No. ML16133A575). The resulting report from the Committee to Review Generic Requirements, "Committee to Review Generic Requirements Response to Tasking Related to Implementation of Agency Backfitting and Issue Finality Requirements and Guidance," dated June 27, 2017 (ADAMS Accession No. ML17174B161), and direction from the Executive Director for Operations, "Tasking in Response to Committee to Review Generic Requirements Report on the U.S. Nuclear Regulatory Commission's Implementation of Backfitting and Issue Finality Requirements," dated July 19, 2017 (ADAMS Accession No. ML17198C141), acknowledge the need for updates to guidance documents on backfitting. Furthermore, in SRM-COMSECY-16-0020, "Staff Requirements — COMSECY-16-0020 — Revision of Guidance Concerning Considerations of Cost and Applicability of Compliance Exception to Backfit Rule," dated November 29, 2016 (ADAMS Accession No. ML16334A462), the Commission directed updates to backfitting guidance related to the consideration of cost and applicability of the compliance exception to the Backfit Rule. These updates are expected to be provided to the Commission in April 2018 for its review and approval.

In a subsequent effort, the NRC could update its guidance to include implementation of Option 1 in terms of how to not apply the reactor design-, construction-, and operation-related provisions of the Backfit Rule to licensees in decommissioning.

4.2.2 Assessment of Option 2

Guidance on how to not apply the reactor design-, construction-, and operation-related provisions of the Backfit Rule to licensees in decommissioning could improve the staff's ability to consistently implement the current Backfit Rule. However, because the issues with the application of the Backfit Rule to licensees in decommissioning are grounded in the language of the Backfit Rule, changes to the relevant guidance documents would not resolve those issues. NRC guidance cannot change the meaning of NRC regulations. Furthermore, updates to the guidance documents are currently underway and undertaking a significant update shortly thereafter would reduce the reliability and predictability of the NRC's guidance documents. To best provide predictability and stability in the application of the Backfit Rule, the NRC should undertake rulemaking.

4.3 Option 3: Conduct Rulemaking to Clarify How the NRC Applies the Backfit Rule to Licensees in Decommissioning

4.3.1 Description of Option 3

The NRC could create a new part within 10 CFR for decommissioning regulations, create a new subpart within 10 CFR Part 50, or amend 10 CFR 50.109 to provide licensees that have had their 10 CFR 50.82(a) certifications docketed by the NRC with the same backfitting protection as they had 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 Ch. I. The current 10 CFR 50.109(a) would be limited to licensees of operating reactors, and the new provision would be limited to licensees in decommissioning.

4.3.2 Assessment of Option 3

As discussed above, applying the current Backfit Rule to licensees in decommissioning would require the NRC to not use certain parts of the Backfit Rule on a case-by-case basis. Thus, to provide the most predictability and stability in the application of the Backfit Rule to licensees in decommissioning, the NRC should conduct rulemaking to clarify the application of the Backfit Rule to licensees in decommissioning.

5 REGULATORY SCOPE

The NRC could propose different rulemaking approaches. The NRC could list the activities and NRC approvals that have, or do not have, backfitting protection during decommissioning. Such a list likely would be site-specific and thus not conducive to generic rulemaking. Also, determining the scope of activities and approvals that would continue from the operations phase into a decommissioning phase could prove to be too complex to include in a regulation. Instead, the NRC could amend its regulations to include a new section that consists of the provisions of the existing backfitting language and new backfitting provisions relevant to a decommissioning licensee.

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

To the extent that implementation guidance is needed for changes to the Backfit Rule to address licensees in decommissioning, the NRC would propose revisions to NUREG-1409. At this time, the NRC staff anticipates crafting regulatory text that is sufficiently clear so that implementation guidance is not needed.

7 IMPACTS

7.1 Option 1: No Action

Under this option, the NRC would continue to apply the Backfit Rule to licensees in decommissioning "to the extent practical."

7.1.1 Impacts on Public Health, Safety, and Security

Because this option would not change the current process, there would be no increase or reduction in public health, safety, and security.

7.1.2 Impacts on Licensees

This option would have no incremental impact on licensees.

7.1.3 Impacts on the NRC

This option would have no incremental impact on the NRC.

7.1.4 Additional Considerations

This option would have no incremental impact on State, local, or Tribal governments.

7.1.5 Summary of Benefits and Costs

This option would have no incremental benefits or costs to the NRC or licensees.

7.2 Option 2: Guidance Development

Under this option, the NRC would amend its guidance on backfitting to explain how to not apply the reactor design-, construction-, and operation-related provisions of the Backfit Rule to licensees in decommissioning.

7.2.1 Impacts on Public Health, Safety, and Security

Because this option would not change the current process, there would be no increase or reduction in public health, safety, and security.

7.2.2 Impacts on Licensees

This option might have slight costs to licensees for reviewing draft guidance and submitting to the NRC comments on the draft guidance.

7.2.3 Impacts on the NRC

This option would result in some one-time costs to the NRC from staff efforts to revise guidance and, if necessary, obtain Commission approval of the updated guidance. Guidance updates would also need to be coordinated with those underway, and could result in delays in completion of the next update to the guidance to provide regulatory stability with the earlier update.

7.2.4 Additional Considerations

This option might have slight costs to State, local, or Tribal governments for reviewing draft guidance and submitting to the NRC comments on the draft guidance.

7.2.5 Summary of Benefits and Costs

This option would have incremental costs to the NRC and licensees.

7.3 Option 3: Rulemaking

Under this option, the NRC would amend its regulations to provide for decommissioning-specific backfitting requirements.

7.3.1 Impacts on Public Health, Safety, and Security

Because this option would continue to apply the Backfit Rule to licensees in decommissioning, it would have no impact on public health, safety, and security.

7.3.2 Impacts on Licensees

Licensees would benefit from having a clearer understanding of how the NRC would apply the Backfit Rule than licensees currently have.

7.3.3 Impacts on the NRC

Initially, the NRC would have incremental costs to undertake the rulemaking process for this portion of the power reactor decommissioning rulemaking. These costs would include both NRC staff and contractor time to prepare proposed rule language, supporting analyses (e.g., a regulatory analysis and Office of Management and Budget paperwork burden analysis), and a *Federal Register* notice, and to conduct public outreach efforts during the proposed rule phase. After publishing the proposed rule, the NRC would incur costs associated with public comment resolution and preparation of the final rule and supporting documentation for the rulemaking. This option would benefit the NRC by clarifying how the NRC would apply the Backfit Rule to licensees in decommissioning.

7.3.4 Additional Considerations

This option might have slight costs to State, local, or Tribal governments for reviewing a proposed rule and submitting to the NRC comments on the proposed rule. These entities would benefit from having a clearer understanding of how the NRC would apply the Backfit Rule than they currently have.

7.3.5 Summary of Benefits and Costs

This option would result in small benefits and costs to the NRC and licensees.

8 BACKFITTING AND ISSUE FINALITY CONSIDERATIONS

Revising the Backfit Rule would not constitute "backfitting" as that term is defined in 10 CFR 50.109(a)(1) or violate any issue finality provision in 10 CFR Part 52 because the Backfit Rule is a set of process requirements that the NRC imposes on itself, not on a holder of a 10 CFR Part 50 or 52 license.

9 NRC OBSERVATIONS ON STAKEHOLDER FEEDBACK ON DRAFT REGULATORY BASIS

9.1 Feedback from Public Meeting

The NRC received a few questions at the May 8, 2017, public meeting about the Backfit Rule in general, and the NRC staff answered those questions during the meeting.

9.2 Main Themes from Public Comment Submission

The NRC received public comment submissions related to the Backfit Rule from industry representatives and State agencies. In their comments on the draft regulatory basis, representatives of the nuclear power industry supported Option 3. Representatives of State agencies argued that the Backfit Rule does not apply to licensees in decommissioning. For the reasons provided in Section 3, "Technical Basis for Consideration in the Decommissioning Rulemaking," of this appendix, specifically the language of the NRC's regulations and the direction of the Commission, the NRC staff disagrees with the position that the Backfit Rule does not apply to licensees in decommissioning.

10 NRC STAFF RECOMMENDATION

Because the issues with the application of the Backfit Rule to licensees in decommissioning are grounded in the language of the Backfit Rule, the NRC staff recommends that the NRC conduct rulemaking (Option 3).

APPENDIX J
AGING MANAGEMENT

CONTENTS

1 INTRODUCTION

To provide reasonable assurance that spent fuel is maintained in a safe condition while in a spent fuel pool (SFP), the U.S. Nuclear Regulatory Commission (NRC) staff reviewed the need for aging management activities to provide reasonable assurance that the intended functions of certain long-lived, passive structures and components (SCs)—e.g., neutron-absorbing materials, the SFP liner, the SFP cooling system—are maintained and monitored during the decommissioning period while nuclear fuel is in the SFP. The review in this appendix does not apply to dry cask storage systems whose regulatory requirements are governed by Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High Level Radioactive Waste and Reactor-Related Great Than Class C Waste."

2 EXISTING REGULATORY FRAMEWORK

An initial operating license is issued for up to 40 years of plant operation. The regulations in 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," allow for a license renewal of up to 20 years. The regulations do not limit the number of 20-year renewal terms that may be issued. With more than 85 percent of the operating fleet possessing renewed licenses for operation to 60 years, several licensees have provided letters of intent to the NRC to submit applications for subsequent license renewal (SLR), which would allow plant operation for 80 years. For example, on November 6, 2015, Dominion Virginia Power notified the NRC of its intent to submit an SLR application in early 2019 for Surry Power Station (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15314A078). On June 7, 2016, Exelon Generation Company, LLC notified the NRC of its intent to submit an SLR application for Peach Bottom Atomic Power Station in the third quarter of 2018 (ADAMS Accession No. ML16159A115). Therefore, a reactor and its SFP may be in operation for 80 years (or possibly longer). The requirements in 10 CFR 50.82, "Termination of license," allow the licensee up to 60 years to decommission the site, with a provision for extensions. A licensee may use 60 years to decommission, following 80 years of reactor operation. Therefore, the NRC staff is basing this evaluation on the potential for a SFP to operate for up to 140 years.

When a licensee enters decommissioning, it removes all fuel from the reactor vessel. That fuel is moved to the SFP, where it is stored with other fuel until it is either moved to an onsite independent spent fuel storage installation (ISFSI) or completely removed from the site. Until all nuclear fuel is removed from the SFP, the SFP performs the same functions as it performs during commercial operation of the facility. This is highlighted in 10 CFR 50.51, "Continuation of license," which states in paragraph (b) that each licensee for a plant that has permanently ceased operation shall continue to take actions to maintain the facility, including, where applicable, the storage, control and maintenance of spent fuel, in a safe condition beyond the license expiration date until the Commission notifies the licensee in writing that the license is terminated. Accordingly, the following pertinent regulations (among others) still apply when a licensee begins decommissioning:

- 10 CFR 50.68, "Criticality accident requirements," specifically paragraph (b)(4): "If no credit for soluble boron is taken, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95 percent probability, 95 percent confidence level, if flooded with unborated water. If credit is taken for soluble boron, the k-effective of the spent fuel storage racks loaded with fuel of

the maximum fuel assembly reactivity must not exceed 0.95, at a 95 percent probability, 95 percent confidence level, if flooded with borated water, and the k-effective must remain below 1.0 (subcritical), at a 95 percent probability, 95 percent confidence level, if flooded with unborated water."

- 10 CFR 50.36, "Technical specifications," paragraph (c)(6): "*Decommissioning*. This paragraph applies only to nuclear power reactor facilities that have submitted the certifications required by [10 CFR] 50.82(a)(1) and to non-power reactor facilities which are not authorized to operate. Technical specifications involving safety limits, limiting safety system settings, and limiting control system settings; limiting conditions for operation; surveillance requirements; design features; and administrative controls will be developed on a case-by-case basis."

- 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," paragraph (a)(1): "For a nuclear power plant for which the licensee has submitted the certifications specified in [10 CFR] 50.82(a)(1) or 52.110(a)(1) of this chapter, as applicable, this section shall only apply to the extent that the licensee shall monitor the performance or condition of all structures, systems, or components associated with the storage, control, and maintenance of spent fuel in a safe condition, in a manner sufficient to provide reasonable assurance that these structures, systems, and components are capable of fulfilling their intended functions."

- 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," particularly section I, "Overall Requirements," and section VI, "Fuel and Radioactivity Control."

3 TECHNICAL BASIS FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

The regulations above clearly indicate a licensee has an obligation to protect the nuclear fuel—and by extension the SCs that support SFP operation—to meet that obligation throughout the decommissioning process until the fuel has been removed from the SFP. Therefore, the NRC staff does not find that new regulations are required.

The provisions in 10 CFR 50.51 and 10 CFR 50.65(a)(1) are sufficient for providing reasonable assurance that long-lived, passive SCs that support SFP operation continue to perform their intended function(s) throughout the decommissioning period. However, there is no guidance that outlines how the licensee will (1) meet the provisions in 10 CFR 50.51 and 50.65(a)(1), or (2) manage the effects of aging for decommissioning plants that did not receive a renewed operating license.

4 RULEMAKING OPTIONS

4.1 Option 1: No Action

4.1.1 Description of Option 1

Under Option 1, there would be no changes to requirements for decommissioning power reactors regarding aging management.

4.1.2 Assessment of Option 1

Licensees would continue to provide reasonable assurance, through their compliance with 10 CFR Part 50 requirements, that the SCs relied upon to meet the regulations for the safe storage of spent fuel are capable of performing their intended safety/design function as long as spent fuel is in the SFP.

4.2 Option 2: Develop and Issue Regulatory Guidance

4.2.1 Description of Option 2

Under this option, the NRC would develop guidance and review and update existing inspection programs.

4.2.2 Assessment of Option 2

There would be no changes to requirements for decommissioning power reactors to implement aging management activities. Licensees would continue to provide reasonable assurance, through their compliance with 10 CFR Part 50 requirements, that the SCs relied upon to meet the regulations for the safe storage of spent fuel are capable of performing their intended safety/design function as long as spent fuel is in the SFP. However, the NRC would issue regulatory guidance to describe adequate methods for implementing the regulations, and update the inspection procedures for decommissioning power reactors to ensure adequate and consistent oversight of aging management. Licensees may voluntarily implement this guidance.

5 REGULATORY SCOPE

No requirements would be amended under either option.

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

6.1 Recent Experience with Decommissioning

The decommissioning plants fall into three categories:

1. Plants that no longer have spent fuel in the SFP (e.g., Zion and Fermi Unit 1).

2. Plants that have spent fuel in the SFP and transitioned to decommissioning prior to the expiration of the initial 40-year license. These plants did not obtain a renewed operating license and, therefore, have not implemented aging management programs (AMPs) (e.g., San Onofre Nuclear Generating Station (SONGS), Crystal River Unit 3, and Millstone Unit 1).

3. Plants that have spent fuel in the SFP and transitioned to decommissioning after issuance of a renewed operating license. These plants implemented AMPs and other aging management activities (e.g., Kewaunee and Vermont Yankee).

In each of these cases, the licensee requested a license amendment to transition to decommissioning defueled technical specifications (TSs). The NRC staff reviewed these

requests on a case-by-case basis, and various outcomes resulted, as noted below and described further in Section 9.2.2 of this appendix.

SONGS Units 2 and 3 permanently shut down in 2013. The licensee agreed via a license condition to implement relevant activities for its SFP and apply appropriate change controls in accordance with the requirements of 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit" (ADAMS Accession No. ML15139A390). SONGS does not currently utilize neutron-absorbing material for criticality control.

Crystal River Unit 3 permanently shut down in 2013. The licensee made a regulatory commitment to implement relevant activities for its SFP and apply appropriate change controls in accordance with Nuclear Energy Institute (NEI) document NEI 99-04, "Guidelines for Managing NRC Commitment Changes," which the NRC has found to be acceptable guidance for controlling regulatory commitments (*see* Letter to R. Beedle, NEI from S. Collins, NRC, "Staff Acceptance of NEI 99-04, 'Guidelines for Managing NRC Commitments,'" dated March 31, 2000 (ADAMS Accession No. ML003696998)). The commitment was incorporated in the licensee's licensing basis via its updated final safety analysis report (UFSAR) (ADAMS Accession No. ML15224B286). Crystal River will submit a license amendment request with a monitoring program for its neutron-absorbing materials if it does not remove all fuel from its SFP by the date specified in the commitment.

Millstone Unit 1 permanently shut down in 1988 and will continue to store spent fuel in the SFP until the licensee moves all spent fuel to the ISFSI in 2048. At present, there is not enough space in the ISFSI to store all of the spent fuel from the Unit 1 pool. NRC inspection reports indicate that the licensee monitors the condition of the spent fuel using testing methods similar to those recommended in license renewal AMPs. The NRC inspection report 05000245/2014010 (ADAMS Accession No. ML14328A190) stated that, in July 2013, a vendor performed Boron Areal Density Gauge for Evaluating Racks (BADGER) testing on certain spent fuel storage racks in the SFP. The test concluded that some degradation of neutron absorber material had occurred, but the SFP racks were capable of performing their design function. The next BADGER test is planned for the third quarter of 2018 to further evaluate the rate of degradation of the SFP racks.

Kewaunee agreed to implement relevant AMPs and other activities for the SFP and to apply appropriate change controls in accordance with the requirements of 10 CFR 50.59, "Changes, tests and experiments," because the AMPs and other activities are described in the facility's UFSAR. Additionally, the NRC conditioned Kewaunee's defueled license to state that the licensee will submit a license amendment request to include the activities in its TSs if spent fuel is not removed from the pool by the date listed in the licensee's post-shutdown decommissioning activities report (ADAMS Accession No. ML14008A297).

Vermont Yankee has a neutron absorber monitoring program for the SFP in place and described it in its UFSAR. The NRC reviewed and approved this program and the UFSAR description of the program as part of Vermont Yankee's license renewal application review. As a result, in the NRC's safety evaluation that reviewed Vermont Yankee's request to implement decommissioning defueled TSs (ADAMS Accession No. ML15117A551), the NRC staff concluded that the monitoring program is sufficient to ensure continued safe operation of the SFP until all fuel is moved to dry storage. The licensee plans to move all fuel from the SFP to dry fuel storage by December 31, 2020.

6.2 Ongoing Efforts Related to Generic Letter 2016-01, "Monitoring of Neutron-absorbing Materials in Spent Fuel Pools"

The NRC's ongoing efforts related to generic letter (GL) 2016-01, "Monitoring of Neutron-absorbing Materials in Spent Fuel Pools" (ADAMS Accession No. ML16097A169) may inform the decommissioning rulemaking efforts. In GL 2016-01, the NRC staff asked licensees to provide information regarding their monitoring of SFP neutron-absorbing materials. The NRC staff is currently reviewing the licensees' responses and determining an appropriate path forward with respect to licensees' neutron monitoring programs. As part of that effort, the NRC staff is currently reviewing NEI 16-03, "Guidance for Monitoring of Fixed Neutron Absorbers in Spent Fuel Pools" (ADAMS Accession No. ML16147A078). This guidance is intended to establish acceptable monitoring programs for neutron-absorbing materials (in the form of AMPs).

7 IMPACTS

7.1 Option 1: No Action

7.1.1 Impacts on Public Health, Safety, and Security

None. The current process protects public health, safety, and security.

7.1.2 Impacts on Licensees

Licensees would continue to be responsible for determining the actions needed to provide reasonable assurance that the SCs relied upon to meet the regulations for the safe storage of spent fuel are capable of performing their intended safety/design function as long as spent fuel is in the SFP.

7.1.3 Impacts on the NRC

The NRC would continue to review each license amendment request to implement decommissioning defueled TSs as a unique, standalone request. Similarly, the NRC staff's inspection of the licensee's actions would rest on a case-by-case analysis with no standards by which to evaluate the actions.

7.1.4 Additional Considerations

None.

7.1.5 Summary of Benefits and Costs

The preparation and review burden associated with a decommissioning application would be unchanged. The licensee's cost to ensure compliance for the appropriate duration would be unchanged. The NRC's cost for verifying compliance during the appropriate duration would be unchanged.

7.2 Option 2: Develop and Issue Regulatory Guidance

7.2.1 Impacts on Public Health, Safety, and Security

None. With the new guidance in place, the process would continue to protect public health, safety, and security.

7.2.2 Impacts on Licensees

Licensees would continue to provide reasonable assurance that the SCs relied upon to meet the regulations for the safe storage of spent fuel are capable of performing their intended safety/design function as long as spent fuel is in the SFP.

7.2.3 Impacts on the NRC

The NRC would review each license amendment request to implement decommissioning defueled TSs for consistency with the guidance. Few requests would be expected to be considered as unique, standalone requests. Staff inspection efforts would have the benefit of regulatory guidance as a reference point.

7.2.4 Additional Considerations

The issuance of additional regulatory guidance could serve to reduce licensee uncertainty and streamline the NRC staff's reviews of requested licensing actions and the inspection of licensee activities and programs.

7.2.5 Summary of Benefits and Costs

The NRC would incur a one-time cost to develop the guidance and update the NRC inspection procedures. Similarities to existing guidance should keep this cost at a minimum. Use of the new guidance by decommissioning applicants would reduce one-time costs for licensees and for the NRC. Licensees would expend fewer resources to prepare and submit decommissioning applications. The NRC would expend fewer resources to review the license amendment requests to implement decommissioning defueled TSs.

Since the guidance would not be prescriptive, it is not anticipated to unilaterally change how an individual licensee will ensure compliance for the appropriate duration. Therefore, the licensee's required cost in ensuring compliance for the appropriate duration should be unchanged. Updated NRC inspection guidance should result in reduced compliance verification costs for the NRC.

8 BACKFITTING AND ISSUE FINALITY CONSIDERATIONS

The guidance would establish, for the first time, a generic, NRC-approved means of complying with the regulatory requirements for long-lived, passive SCs that are necessary to protect the nuclear fuel for the decommissioning period. Licensees could voluntarily implement this guidance, and the NRC could use this guidance in its review of license amendment requests related to these regulatory requirements. Thus, the guidance would not constitute "backfitting" as defined in 10 CFR 50.109, "Backfitting," or a violation of issue finality under the applicable

provisions of 10 CFR Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.”

9 NRC OBSERVATIONS ON STAKEHOLDER FEEDBACK ON DRAFT REGULATORY BASIS

9.1 Feedback from Public Meeting

During the public meeting on May 9, 2017, the NRC staff discussed Appendix J and the proposed options. The feedback from members of the public was mostly associated with the aging management of ISFSIs, which is outside the scope of this regulatory basis.

9.2 Main Themes from Public Comment Submission

The NRC received five submittals with comments on the topic of aging management for SFPs: two submittals were from State governments, two submittals were from non-governmental organizations, and one submittal was from an industry representative. The main themes of the comments received were as follows:

(1) the need for rulemaking
(2) site-specific considerations
(3) suggestions for contents of regulatory guidance
(4) distinguishing between requirements for SFPs and dry cask storage
(5) use of destructive testing

9.2.1 The Need for Rulemaking

Some public comments agreed that the existing regulatory framework was sufficient, while other comments urged development of new regulations, specifically with respect to the process of creating the post-shutdown decommissioning activities report. Similarly, some public comments indicated that additional regulatory guidance would be sufficient to clarify the issues raised in this appendix, while other comments argued that guidance would not be sufficient.

NRC Response

The NRC staff does not recommend rulemaking to require aging management activities during the decommissioning period on the basis of the regulations in 10 CFR 50.51. The NRC and the nuclear industry have demonstrated concern for aging degradation of passive, long-lived SCs, regardless of whether a plant is operating or decommissioning. The NRC staff determined that sufficient regulatory basis already exists to provide reasonable assurance that licensees adequately protect the nuclear fuel—and by extension the structures, systems, and components— that they rely upon to meet that obligation. Therefore, the NRC staff does not find that any new regulations are necessary. However, it is possible for certain SCs to operate for up to 140 years or longer (40-year initial operating period plus two or more 20-year renewals, in addition to the 60-year decommissioning period). Therefore, it is reasonable and appropriate to develop regulatory guidance regarding the monitoring and management of passive, long-lived SCs that are expected to operate throughout the decommissioning period.

9.2.2 Site-Specific Considerations

One commenter noted that license amendment requests to implement decommissioning defueled TSs have been reviewed on a case-by-case basis. The commenter found that the outcomes for the different sites varied and questioned the basis for the variance. The commenter asked if site-specific reviews are necessary or if the outcomes can be made consistent.

Another commenter cited examples of aging management issues at a plant that is shut down and does not have a formal AMP in place. The commenter questioned the effect of not having an AMP and whether it is safe to store spent fuel in the SFP for many years, given that degradation issues have been identified.

NRC Response

The various outcomes of recent decommissioning reviews for SONGS, Crystal River, Kewaunee, and Vermont Yankee were a result of the different circumstances each plant presented at the time the plants shut down for decommissioning. As stated above, plants that shut down during the first 40 years of operation may not have AMPs in place. Other plants that shut down during the renewed operating license period may have AMPs in place. During its review, the NRC will still need to consider the circumstances for each decommissioning plant. The guidance would provide acceptable approaches that the licensees can voluntarily implement to manage age-related degradation during the decommissioning period.

Inspections are another aspect of long-term aging management. The NRC performs semi-annual inspections at decommissioned plants using inspection procedure 62801, "Maintenance and Surveillance at Permanently Shutdown Reactors" (ADAMS Accession No. ML15202A263). The inspections will review and assess the licensees' decommissioning activities to ensure that SCs needed to support the SFP continue to perform their intended function(s) in accordance with 10 CFR 50.51 and 10 CFR 50.65.

The NRC staff notes that this appendix pertains to the development of a regulatory basis for issues generic to the fleet of nuclear power plants. As such, any site-specific issues are considered as examples to illustrate issues for the regulatory basis. However, site-specific issues themselves are beyond the scope of the rulemaking process and will not be addressed explicitly.

9.2.3 Suggestions for Contents of Regulatory Guidance

One commenter stated that the resolution of issues raised in Generic Letter 2016-01, "Monitoring of Neutron-absorbing Materials in Spent Fuel Pools" (ADAMS Accession No. ML16097A169) should be applied to all Part 50 licensees who store spent fuel in an onsite spent fuel pool. The commenter also recommended that the NRC endorse NEI 16-03, "Guidance for Monitoring of Fixed Neutron Absorbers in Spent Fuel Pools" (ADAMS Accession No. ML16147A078) so that licensees who have permanently ceased operations could adopt the NEI guidance.

One commenter recommended that any new guidance be consistent with the methods recommended in the AMPs in NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report", issued December 2010 (ADAMS Accession No. ML103490041). The advantage of such an approach would be that licensees could maintain greater programmatic

continuity through the decommissioning process and would be able to take advantage of operating experience.

NRC Response

The NRC will consider the acceptable methods for managing the effects of age-related degradation during the decommissioning period and will document these methods in an NRC-issued guidance document. This section of the regulatory basis does not recommend rulemaking to require that licensees manage the effects of age-related degradation. Therefore, the methods outlined in the guidance may be voluntarily implemented by licensees. The NRC will take into account the discussions in Generic Letter 2016-01, NEI 16-03 (currently under review by the NRC), and NUREG-1801 when developing the guidance for managing the effects of age-related degradation during the decommissioning period.

9.2.4 Distinguishing between Requirements for SFPs and Dry Cask Storage

One commenter noted that the draft regulatory basis discussed three categories of SFPs. The first category is for stand-alone ISFSI sites that no longer have fuel in the SFP and have also decommissioned the SFP. The commenter recommended that the regulatory basis state explicitly that this appendix does not apply to dry cask storage systems with aging management requirements contained in the associated renewed Certificates of Compliance, site-specific licenses, or to sites that no longer have SFPs.

NRC Response

The NRC staff agrees with the comment that the Appendix J discussion from the draft regulatory basis did not apply to dry cask storage systems which are governed by 10 CFR Part 72. The regulatory basis has been revised to state this explicitly in the introduction of this appendix.

9.2.5 Use of Destructive Testing

One commenter recommended that the NRC perform destructive examinations, material testing, and material harvesting at decommissioning facilities.

NRC Response

While the NRC has been involved with examination and testing activities at decommissioning facilities, this section of the regulatory basis is focused solely on managing the effects of age-related degradation at decommissioning facilities. Activities involving destructive examinations, material testing, or material harvesting are outside the scope of this regulatory basis.

10 NRC RECOMMENDATION

The NRC staff recommends Option 2. The issuance of guidance that recommends methods for demonstrating how the effects of aging will be managed for passive, long-lived SCs will reduce the level of regulatory uncertainty and burden associated with a case-by-case review and provide acceptable approaches for meeting the regulatory requirements already included in 10 CFR Part 50.

If a licensee adopts an approach for managing the aging of its passive, long-lived SCs during the decommissioning period, that approach would become subject to inspection. Therefore, the NRC staff would review, and update as necessary, the inspection procedures for decommissioning power reactors to ensure adequate and consistent oversight of aging management.

APPENDIX K
FATIGUE MANAGEMENT

CONTENTS

1 INTRODUCTION

Currently, the requirements of Subpart I, "Managing Fatigue," of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 26, "Fitness for Duty Programs," apply to all licensees under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," that are authorized to operate a nuclear power plant and all holders of a combined license (COL) under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," after the Commission makes its 10 CFR 52.103(g) finding.

The remainder of this appendix considers the existing regulatory framework and the technical basis for options to establish an appropriate level of fatigue management to ensure public health and safety or the common defense and security for nuclear power reactors that have been permanently shut down and defueled. The U.S. Nuclear Regulatory Commission (NRC) considered three options: (1) no action, (2) voluntary industry initiatives for fatigue management, and (3) rulemaking to codify fitness-for-duty (FFD) fatigue requirements for decommissioning power reactors.

2 EXISTING REGULATORY FRAMEWORK

On June 7, 1989, when the NRC issued 10 CFR Part 26 in a final rule (Volume 54 of the *Federal Register* (FR), page 24468 (54 FR 24468)), it focused on establishing requirements for preventing and detecting personnel impairment from drugs and alcohol. However, several requirements addressed other causes of impairment, including fatigue. Those requirements included general performance objectives (10 CFR 26.10(a) and (b)) that provided for "reasonable assurance that nuclear power plant personnel are not under the influence of any substance, legal or illegal, or mentally or physically impaired from any cause" and "early detection of persons who are not fit to perform activities within the scope of this part." The NRC also included a requirement in 10 CFR 26.20(a) for licensee policies to "address other factors that could affect fitness for duty such as mental stress, fatigue and illness." In its staff requirements memorandum (SRM) on the final rule, the Commission directed the NRC staff to continue to analyze licensee programs, assess the effectiveness of the rule, and recommend appropriate improvements or changes. The 1989 rule did not address licensees in the process of decommissioning their power reactors.

On March 31, 2008, the NRC issued an amendment to 10 CFR Part 26 (73 FR 16966; hereafter referred to as the "2008 final rule"). In the 2008 final rule, the NRC stated the following:

> During the development of the fatigue management requirements, the NRC observed an increase in concerns (e.g., allegations, media and public stakeholder reports) related to the workload and fatigue of security personnel at licensee facilities following the terrorist attacks of September 11, 2001. Subsequent to an NRC review of the control of work hours for security force personnel, and public interactions with stakeholders, the Commission issued Order EA-03-038 on April 29, 2003, requiring compensatory measures related to fitness-for-duty enhancement for security personnel at nuclear power plants, including work hour limits.

Order EA-03-038, "Issuance of Order for Compensatory Measures Related to Fitness-for-Duty Enhancements Applicable to Nuclear Facility Security Force Personnel," dated April 29, 2003

(Agencywide Documents Access and Management System (ADAMS) Accession No. ML030940198), did not apply to licensees with decommissioning reactors.

In SRM-COMSECY-04-0037, "Staff Requirements— COMSECY-04-0037—Fitness-for-Duty Orders To Address Fatigue of Nuclear Facility Security Force Personnel," dated September 1, 2004 (ADAMS Accession No. ML042450533), the Commission disapproved the issuance of orders concerning FFD enhancements to address fatigue concerns for security force personnel at decommissioning reactors and other facilities. It determined that the NRC staff should pursue FFD program enhancements related to the fatigue of security force personnel at decommissioning reactors as a separate rulemaking activity with additional stakeholder interactions.

In the 2008 final rule, the NRC added, among other things, Subpart I, "Managing Fatigue," to 10 CFR Part 26. Licensees' compliance with Subpart I within the scope of an overall FFD program provides reasonable assurance that the effects of fatigue and degraded alertness on an individual's ability to safely and competently perform his or her duties are managed commensurate with maintaining public health and safety. The fatigue management provisions also reduce the potential for security officer fatigue to adversely affect the common defense and security. However, the scope of that rulemaking effort did not consider decommissioning power reactors.

For power reactor licensees, the scope of 10 CFR Part 26 is limited in 10 CFR 26.3(a) to those licensees that are authorized to operate under 10 CFR 50.57, "Issuance of operating license," and to holders of COLs under 10 CFR Part 52, after the Commission makes its 10 CFR 52.103(g) finding. Once the NRC dockets the certifications of permanent shutdown and removal of fuel from the reactor vessel under 10 CFR 50.82(a) (or if the Commission orders the licensee to cease operations), the 10 CFR Part 50 licensee is not authorized to operate and is outside the scope of 10 CFR Part 26. Therefore, 10 CFR Part 26, including the fatigue management provisions of Subpart I, does not directly and explicitly apply to 10 CFR Part 50 licensees that are no longer authorized to operate, which include decommissioning reactor licensees. However, these provisions do apply to holders of a COL under 10 CFR Part 52 after the Commission has made the finding under 10 CFR 52.103(g). This inconsistency is addressed in Appendix D, "Drug and Alcohol Testing," of the regulatory basis.

3 TECHNICAL BASIS FOR CONSIDERATION IN THE DECOMMISSIONING RULEMAKING

The 2008 final rule provides the technical basis for requiring certain licensees to have fatigue management programs. The technical basis focused primarily on current and future operating reactors and also included COL holders during the decommissioning of their facilities. The justification for the Subpart I provisions considered factors such as extensive work hours, stressful working conditions, sleep disorders, accumulation of sleep debt, and disruptions of circadian rhythms associated with shift work.

The scope of Subpart I ensures that appropriate work hour controls are applied to personnel who perform functions that are significant to the protection of public health and safety or the common defense and security, including individuals performing risk-significant operations or maintenance duties; health physics, chemistry, and fire brigade duties important to emergency response; and security duties important to maintaining the security of the plant.

The NRC staff recognizes that, at a nuclear power reactor that has permanently ceased operations and removed fuel from the reactor vessel, the spectrum of possible accidents is significantly smaller and the risk of an offsite radiological release is significantly lower than at an operating power reactor. As compared to an operating reactor, issues requiring a complex and rapid response are significantly reduced or eliminated at a decommissioning plant, primarily because of the slowly evolving nature of possible events at a decommissioning plant. Therefore, the number of tasks that may have significance to the protection of public health and safety or the common defense and security are likewise reduced at a decommissioning reactor.

However, the functions of two sets of individuals at decommissioning reactors have the potential to be significant to the protection of public health and safety or the common defense and security: security personnel and certified fuel handlers (CFHs).

Licensees make many changes to the facility's security plan when the facility enters decommissioning status. One major change to the plan is that the number of target sets that must be protected at a decommissioning reactor is significantly less than at an operating reactor. Although the target sets are significantly reduced, security personnel must react sufficiently to counter the design-basis threat in a manner similar to that for operating nuclear reactors. Decommissioning reactors continue to use a defense-in-depth concept (e.g., vehicle barriers, intrusion detection, armed security officers) to ensure that the facility is protected from external threats. When changes to the security plan are made, the NRC reviews and makes a determination on whether the changes represent a decrease in safeguards effectiveness. If changes to the facility security plan constitute a decrease in safeguards effectiveness, the NRC must approve the changes to the plan.

Once a licensee transitions to decommissioning, licensed operators are replaced with CFHs as the onshift management representative responsible for supervising and directing the monitoring, storage, handling, and cooling of irradiated nuclear fuel in a manner consistent with ensuring public health and safety. These individuals are also responsible for making emergency action level declarations. Successful completion of the cognitive and behavioral tasks performed by CFHs at a decommissioning facility depends on the ability of these personnel to remain alert, analyze problems, make accurate decisions, and communicate and work effectively as a team.

3.1 Recent Activity on Fatigue Management at Decommissioning Power Reactors

Recent experience with decommissioning power reactors has demonstrated that fatigue management practices vary by licensee after permanent cessation of operations. For example, of the five reactors that entered decommissioning status in 2013 and 2014, two reactor sites (Crystal River Nuclear Generating Station and Vermont Yankee Nuclear Power Station) have changed their physical security plans under 10 CFR 50.54(p) to remove the requirements to comply with Subpart I of 10 CFR Part 26. These sites replaced their fatigue management programs with less stringent programs to manage fatigue for security officers. The NRC reviewed the changes in the security plans for these sites and agreed that the plans did not represent a decrease in safeguards effectiveness. The other reactor sites have, to date, maintained Subpart I programs for security officers within their physical security plans. The NRC staff is unaware of any licensee imposing voluntary requirements for fatigue management on CFHs. The staff is also not aware of any adverse safety impacts resulting from inconsistent fatigue management at decommissioning plants.

On November 30, 2015, the Nuclear Energy Institute (NEI) submitted NEI 15-08, Revision 0, "Managing Personnel Fatigue at Decommissioning Reactors," dated November 3, 2015, to the NRC staff for its review and consideration for endorsement (ADAMS Accession No. ML15350A153). The guidance in NEI 15-08 includes administrative work hour controls on security personnel when unforeseen problems require significant amounts of overtime. The document also addresses policy objectives that should be included in the program and a mechanism for approval of deviations from the guidelines. NEI 15-08 was based on Generic Letter (GL) 82-12, "Nuclear Power Plant Staff Working Hours," dated June 15, 1982, but the NRC concluded in the 2008 final rule that GL 82-12 did not include consistent or readily enforceable requirements to address worker fatigue. The NRC staff responded to the NEI in a letter dated June 22, 2016 (ADAMS Accession No. ML16125A374), declining to fully review and/or endorse NEI 15-08, but stating that it considered the submitted document informational and may use elements of the document in support of the proposed decommissioning rulemaking effort.

3.2 NRC Staff Evaluation

As previously stated, the NRC staff recognizes that the spectrum of possible accidents is significantly smaller and the risk of an offsite radiological release is significantly lower at a decommissioning reactor than at an operating power reactor. In Section 2.2 and Appendix A of this document, the NRC staff concludes that, after a cooling period of 10 months for boiling-water reactors or 16 months for pressurized-water reactors, the spent fuel cannot reasonably heat up to clad ignition temperature within 10 hours of a significant draindown event in the spent fuel pool (SFP). This time after shutdown corresponds to the decommissioning plant's transition from Level 1 to Level 2, as described in Appendix A to the regulatory basis. Once the spent fuel has reached this level of decay, the potential consequences of an accident or security event are further reduced because a Level 2 decommissioning plant has no design-basis events that could result in an offsite radiological release exceeding the limits established by the U.S. Environmental Protection Agency.

Recognizing the significant reduction in radiological risk and consequences of an accident or security event for a decommissioning reactor, the NRC staff considered whether to apply fatigue management provisions to limited individuals (i.e., security personnel and CFHs) because these individuals perform functions having the potential to be significant to the protection of public health and safety or the common defense and security. Because of the continuous reduction in decay heat levels and associated reduction in radiological risks, the fatigue management provisions for both functions would apply only to the time period when decay heat levels are sufficiently high to potentially cause offsite effects.

The NRC considered the following resources in addressing potential changes to the current regulatory framework for fatigue management at decommissioning sites:

- the 2008 final rule

- "Alternative to Minimum Days Off Requirements; Final Rule" (76 FR 43548; July 21, 2011)

- Regulatory Guide 5.73, "Fatigue Management for Nuclear Power Plant Personnel," issued March 2009 (ADAMS Accession No. ML083450028)

- NEI 06-11, Revision 1, "Managing Personnel Fatigue at Nuclear Power Reactor Sites," issued October 2008 (ADAMS Accession No. ML090360158)

- NEI 15-08, Revision 0, "Managing Personnel Fatigue at Decommissioning Reactors," dated November 3, 2015 (ADAMS Accession No. ML15350A153)

4 RULEMAKING OPTIONS

4.1 Option 1: No Action

4.1.1 Description of Option 1

The no-action option would retain the FFD provisions of the current regulations. The fatigue management provisions contained in 10 CFR Part 26, Subpart I, would continue to not apply to decommissioning licensees under 10 CFR Part 50. However, these provisions would continue to apply to holders of a COL under 10 CFR Part 52 after the Commission has made the finding under 10 CFR 52.103(g). This inconsistency is addressed in Appendix D, "Drug and Alcohol Testing," of the regulatory basis.

4.1.2 Assessment of Option 1

Decommissioning power reactor licensees with 10 CFR Part 50 operating licenses would continue to be outside the scope of Subpart I; however, as operating experience has shown, licensees will likely maintain a work hour control program for their security personnel as part of their security plan.

Additionally, the risk associated with the spectrum of accidents at decommissioning plants is low in comparison to those of an operating reactor partly because of the significant reduction in radiological risk and consequences of an accident or security event. Furthermore, the events considered are slow-moving events that provide substantial time for operator actions to mitigate and prevent offsite consequences.

With regard to security personnel, the transition results in a significant reduction in target sets at a decommissioning plant as well as changes to the site security plans. Licensees will continue to employ a defense-in-depth concept for security by using multiple layers of protection (e.g., vehicle barriers, intrusion detection, armed security personnel) to prevent security events from having offsite consequences. Changes to the site security plan must be evaluated, especially for its fatigue management program, and the NRC must approve the changes such that there will be no decrease in safeguards effectiveness.

To date, the NRC is not aware of any adverse safety impacts resulting from inconsistent fatigue management at decommissioning plants.

4.2 Option 2: Voluntary Industry Initiatives for Fatigue Management

4.2.1 Description of Option 2

In this option, the NRC staff would consider voluntary industry initiatives such as those proposed in NEI 15-08.

4.2.2 Assessment of Option 2

NEI submitted a draft of NEI 15-08 that included industry proposed guidelines for decommissioning licensees. This guidance is based on the GL 82-12 with specific changes to some work hour rules that correspond to relaxations in the overall programmatic requirements in Subpart I of 10 CFR Part 26. The guidelines proposed by NEI would apply to personnel performing assigned security-related job duties, but they are silent on CFHs. In the 2008 final rule, the NRC concluded that, with the exception of orders limiting the work hours of security personnel, the former regulatory framework of GL 82-12 did not include consistent or readily enforceable requirements to address worker fatigue. Additionally, the NRC stated that the regulatory framework based on GL 82-12 included requirements that were inadequate and incomplete for effective fatigue management. The conclusions reached in development of the 2008 final rule were focused on operating reactors. An in-depth analysis of the adequacy of GL 82-12 and NEI 15-08 for managing fatigue at decommissioning license holders would need to be pursued if this option were taken.

In comparison to Option 1, Option 2 has the potential to promote uniformity and standardization in the application of fatigue management programs and to provide greater confidence that decommissioning sites will maintain the programs. However, after reviewing the industry's initial proposal in NEI 15-08, the NRC staff concluded that it would require extensive analyses and considerable interactions with industry and the public stakeholders to develop guidance that the NRC would find acceptable.

4.3 Option 3: Rulemaking To Codify Fitness-for-Duty Fatigue Requirements for Decommissioning Power Reactors

4.3.1 Description of Option 3

In this option, the NRC would pursue rulemaking to codify new fatigue management requirements for decommissioning power reactors. The NRC would amend 10 CFR Part 26 to apply to security personnel and CFHs for decommissioning power reactors under 10 CFR Part 50 and 10 CFR Part 52. This would apply until such time that the fuel in the SFP has decayed so that a period of 10 hours is available to initiate mitigation measures in the event of a zirconium fire scenario (i.e., 10 months for boiling-water reactors and 16 months for pressurized-water reactors), as discussed in Section 2.2 of this regulatory basis. This approach is similar to the graded approach to emergency planning, and the time after shutdown corresponds to the decommissioning plant's transition from Level 1 to Level 2, as described in Appendix A to the regulatory basis.

4.3.2 Assessment of Option 3

This option would provide new fatigue management requirements for security personnel and CFHs after a nuclear power reactor has entered the decommissioning phase. This option would maintain the requirements until the plant transitions from Level 1 to Level 2 (i.e., until the spent fuel in the SFP has sufficiently decayed and the potential consequences of an accident or security event are significantly reduced).

As discussed in Section 4.1.2 of this appendix, decommissioning reactors do not require the type of fatigue management program that an operating reactor demands. Given the small radiological risks and safety and security consequences of an accident at a decommissioning reactor, a rulemaking under Option 3 would not substantially increase the level of protection of public health and safety and the common defense and security at a decommissioning reactor. In a related matter, in Appendix D to this document, the NRC is considering which elements of a licensee's fitness for duty program should be incorporated in licensees' Insider Mitigation Programs (IMP). These elements could include a behavioral observation program to detect, in the individuals who are subject to the IMP, behaviors that may indicate impairment from fatigue.

5 REGULATORY SCOPE

A rulemaking would include revisions to 10 CFR Part 26 to extend fatigue management provisions to security personnel and CFHs at decommissioning power reactors.

6 NRC GUIDANCE, POLICY, AND IMPLEMENTATION ISSUES

6.1 NRC Guidance

As explained in Section 4.2.2 for Option 2, the NRC staff concluded that it would require extensive analyses and considerable interactions with industry and the public to develop guidance that the NRC would find acceptable. Under Option 3, the NRC would need to update RG 5.73 to support rulemaking.

6.2 Policy Issues

Because the regulations at 10 CFR Part 26 do not apply to decommissioning plants, licensees have adopted different approaches to manage fatigue. When a licensee enters decommissioning, it makes many changes to the site security plan, including changes to the facility's fatigue management program. If an evaluation shows that these changes constitute a decrease in safeguards effectiveness, the NRC must approve such changes. Although the NRC staff is not aware of any adverse safety impacts resulting from inconsistent fatigue management at decommissioning plants, the absence of relevant requirements or guidance has the potential to create uncertainty as to what elements a facility should include in its fatigue management program during decommissioning.

6.3 Implementation Issues

The staff has identified some obstacles to implementing Option 2, as described in Section 4.2.2. The staff has not identified any specific implementation issues associated with Option 3.

7 IMPACTS

This section analyzes the alternatives presented in this appendix.

7.1 Option 1: No Action

Under this option, the NRC staff would continue with the existing practices as described in the current regulations and guidance.

7.1.1 Impacts on Public Health, Safety, and Security

There is no incremental impact to public health, safety, and security under this option.

7.1.2 Impacts on Licensees

Taking no action would likely result in continued inconsistent implementation of fatigue management practices for decommissioning reactors. Even though no regulations require it, operating experience has shown that licensees entering decommissioning implement some fatigue requirements for their security officers under their security plans.

7.1.3 Impacts on the NRC

The NRC stays cognizant of changes to the site security plan (which includes fatigue management for security officers) for each licensee that chooses to decommission. This option would have no incremental impact on the NRC.

7.1.4 Additional Considerations

This option would have no incremental impact on State, local, or Tribal governments.

However, Option 1 leaves in place the inconsistencies in fatigue management requirements that apply to key personnel (i.e., security personnel and CFHs) who perform similar duties at a decommissioning facility as they do at an operating reactor site. Because Subpart I of 10 CFR Part 26 does not apply to an operating reactor under Part 50 after it has entered the decommissioning phase, a decommissioning plant possibly could refrain from imposing any fatigue-related requirements for plant personnel at the decommissioning site. However, these provisions would continue to apply to holders of a COL under 10 CFR Part 52 after the Commission has made the finding under 10 CFR 52.103(g). This inconsistency is addressed in Appendix D of the regulatory basis.

7.1.5 Summary of Benefits and Costs

There would be no incremental benefits or costs to licensees or the NRC.

7.2 Option 2: Voluntary Industry Initiatives for Fatigue Management

Under this option, the NRC staff would consider voluntary industry initiatives for managing fatigue at decommissioning power reactors. In parallel, the industry would need to engage and respond to NRC concerns about the industry's initiatives for fatigue management.

7.2.1 Impacts on Public Health, Safety, and Security

There is a potentially small positive impact to public health, safety, and security under this option, given increased uniformity of fatigue management at decommissioning power reactors. Although licensees would have no requirement to adopt the measures, this option would establish industry guidelines for fatigue requirements at decommissioning power reactors.

7.2.2 Impacts on Licensees

The industry would incur a one-time cost associated with addressing NRC concerns during the development of voluntary industry initiatives and ongoing costs for implementing the program.

7.2.3 Impacts on the NRC

The NRC would incur a one-time cost and ongoing costs to consider voluntary initiatives for industry-proposed fatigue management programs. The one-time costs include (1) NRC staff and contractor time to review industry guidance and provide supporting analyses and (2) substantial interactions with industry and public stakeholders to develop the guidance. The ongoing costs would be limited to ensuring the licensees' compliance with the industry's initiatives through inspection activities.

7.2.4 Additional Considerations

This option would have no incremental impact on State, local, or Tribal governments.

7.2.5 Summary of Benefits and Costs

This option would promote uniformity and standardization in the application of fatigue management programs at decommissioning power reactors. Therefore, licensees may see long-term savings resulting from their use of standard industry guidance versus development of their own guidance. The benefits of this option depend on the licensees' voluntary adoption of the guidelines developed with no corresponding regulatory requirement. With a lack of regulatory requirements, licensees would likely continue to implement measures at their own discretion and maintain the current inconsistent application of fatigue management at decommissioning licensees.

The costs associated with this option include development and implementation of voluntary industry initiatives and the ongoing inspection activities. Because the current draft guidance developed by industry, NEI 15-08, is based on GL 82-12, which the NRC has previously deemed inadequate and incomplete for effective fatigue management, both industry and the NRC would likely incur significant costs to obtain alignment on their approaches. The preliminary draft regulatory analysis for the potential rulemaking revealed these substantial costs.

7.3 Option 3: Rulemaking To Codify Fitness-for-Duty Fatigue Requirements for Decommissioning Power Reactors

Under this option, the NRC staff would undertake a rulemaking to codify fatigue management requirements for security personnel and CFHs at decommissioning power reactors. The

changes to the underlying regulations and guidance would support a robust set of rules and guidance for Level 1 of the decommissioning process with no imposition of requirements once the decommissioning facility reaches Level 2 (i.e., until the spent fuel in the SFP has sufficiently decayed and the potential consequences of an accident or security event are significantly reduced).

7.3.1 Impacts on Public Health, Safety, and Security

As stated in Section 4.3.2 of this appendix, although the risk associated with the spectrum of accidents at decommissioning plants is low in comparison to those of an operating reactor partly because of the significant reduction in radiological risk and consequences of an accident or security event, a rulemaking under Option 3 could potentially have a small, but insignificant increase in the level of protection of public health and safety and the common defense and security at a decommissioning reactor.

7.3.2 Impacts on Licensees

Decommissioning power reactor licensees would incur costs from implementing the fatigue management provisions specified in the rule.

7.3.3 Impacts on the NRC

Overall, this option would result in one-time costs associated with rulemaking efforts. Initially, the NRC would incur incremental costs to undertake the rulemaking process for this portion of the power reactor decommissioning rulemaking. These costs include the preparation of the proposed rule and accompanying guidance. The costs would include both NRC staff and contractor time to prepare proposed rule language, draft guidance, supporting analyses (e.g., a regulatory analysis and Office of Management and Budget Paperwork Burden analysis), and a *Federal Register* notice, and conduct public outreach efforts during the rule and guidance development phase. After publishing the proposed rule, the NRC would incur costs associated with public comment resolution and preparation of the final rule, guidance documents, and supporting documentation for the rulemaking.

7.3.4 Additional Considerations

The proposed rule would have no incremental impact on State, local, or Tribal governments.

7.3.5 Summary of Benefits and Costs

As stated in Section 4.3.2 of this appendix, although the risk associated with the spectrum of accidents at decommissioning plants is low in comparison to those of an operating reactor partly because of the significant reduction in radiological risk and consequences of an accident or security event, this option could provide some small measure of regulatory stability and predictability to the decommissioning process.

This option would have one-time costs to the NRC to develop the rule, revise guidance, and implement the rule. The NRC would incur minimal ongoing costs for ensuring compliance with the rule until the plant reaches Level 2 in the decommissioning process. Licensees would have implementation costs to maintain compliance with the rule for the specified period of time after shutdown.

8 BACKFITTING AND ISSUE FINALITY CONSIDERATIONS

In SRM-COMSECY-04-0037, the Commission disapproved the issuance of orders concerning FFD enhancements to address fatigue concerns for security force personnel at decommissioning reactors and other facilities and determined that FFD program enhancements related to the fatigue of security force personnel at decommissioning reactors should be pursued as a separate rulemaking activity with additional stakeholder interactions. If the Commission had noted an adequate protection issue, it would have pursued the issuance of orders. Further, the Commission directed the NRC staff to inform them promptly if the staff observes significant fatigue-related issues at these facilities (including decommissioning facilities) or any other facilities. To date, the NRC staff has not identified any significant fatigue-related issues at decommissioning power reactors. Because the proposed fatigue management requirements do not result in adequate protection and are not necessary to bring a licensee into compliance with a requirement or commitment, for the rulemaking to proceed, it would have to result in a cost-justified, substantial increase in the protection of public health and safety or the common defense and security. As explained in Section 4.3.2 of this appendix, a rulemaking under Option 3 would not substantially increase the level of protection of public health and safety and the common defense and security. Therefore, Option 3 would fail a backfit analysis. Furthermore, Option 1 does not present any changes to current requirements or staff positions, and Option 2 would result in guidance that would not be imposed on licensees, so neither option would constitute "backfitting" as that term is defined in 10 CFR 50.109.

9 NRC OBSERVATIONS ON STAKEHOLDER FEEDBACK ON THE DRAFT REGULATORY BASIS

In response to the draft regulatory basis, the NRC received public comments concerning changes to the fatigue management requirements for decommissioning power reactors. The NRC considered the public comments received on the draft regulatory basis in the development of the rulemaking options presented in this appendix.

Several commenters supported Option 3 to provide a consistent approach to fatigue management at decommissioning power reactors. The comments suggested that all the fatigue management requirements in 10 CFR Part 26, Subpart I, should remain applicable to workers at decommissioning power reactor sites until license termination. These commenters cited concerns with the vulnerability and potential consequences of an attack or accident at decommissioning power reactors.

Other commenters supported Option 2 as a way to provide guidelines for fatigue management without the full cost of a rulemaking effort.

The NRC also received comments that, given the reduced risks, the requirements in Subpart I should not be applied to licensees once the 10 CFR Part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel in accordance with 10 CFR 50.82(a)(2).

10 STAFF RECOMMENDATION

With respect to rulemaking (Option 3), the NRC staff provided details in this appendix to demonstrate that there is insufficient basis to recommend a rulemaking that would provide a substantial increase in the protection of public health and safety. Operating experience has not revealed safety significant issues at decommissioning sites concerning fatigue, and licensees have maintained some level of fatigue management at decommissioning sites in accordance with their security plans.

Furthermore, the NRC staff is not recommending voluntary industry initiatives (Option 2). Because the NRC determined that the voluntary initiative proposed by the industry, as reflected in NEI 15-08, was inadequate and incomplete for effective fatigue management, both industry and the NRC would likely incur significant costs to align on an adequate fatigue management program.

In conclusion, the NRC staff recommends no action (Option 1) to extend the applicability of 10 CFR Part 26, Subpart I, to decommissioning licensees.

SUBJECT: REGULATORY BASIS: Regulatory Improvements for Power Reactors Transitioning to Decommissioning DATED:

ACCESSION NO.: PKG: * concurrence via email.

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