Reactor Decommissioning Financial Assurance Working Group Final Report

April 6, 2020

Enclosure1

Contents

Purpose:

The purpose of the inter-Office Working Group is to leverage legal, licensing, and oversight expertise to evaluate the existing decommissioning financial assurance licensing and oversight process. The Working Group (WG) has been assigned to comprehensively document and evaluate whether the existing decommissioning financial assurance licensing and oversight process remains adequate with respect to how decommissioning is likely to be accomplished in the future or if the U.S. Nuclear Regulatory Commission (NRC) has the appropriate infrastructure to identify any potential challenges. In addition, the working group will identify potential program enhancements to improve the efficiency, effectiveness and transparency of the program (particularly to interested external stakeholders). A list of the Working Group membership is provided in Appendix A.

Executive Summary:

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.82, "Termination of license," require that power reactor decommissioning (removing a facility or site safely from service and reducing residual radioactivity to a level that permits release of the property and termination of the license) will be completed within 60 years of permanent cessation of operations. The regulations in 10 CFR 50.75, "Reporting and recordkeeping for decommissioning planning," specify how a licensee will provide reasonable assurance that funds will be available for decommissioning from the granting of a license to the termination of the license.

Over the last decade, licensees have adopted new business approaches (i.e., models) for accomplishing decommissioning. In general, there are currently four models:

1) The Licensee Model: The licensee for the reactor when it was operating maintains the license in decommissioning and performs the decommissioning (e.g., Humboldt Bay). The licensee could be an electric utility or a non-utility company (i.e., a merchant plant).
2) The Decommissioning Contract Model: The licensee for the reactor when it was operating maintains the license in decommissioning and manages a decommissioning contractor (e.g., Fort Calhoun and San Onofre).
3) The Temporary License Transfer Model: The licensee for the reactor when it was operating requests a transfer of the 10 CFR Part 50 license to a decommissioning company for accelerated decommissioning (i.e., decommissioning in significantly less time than the allowed 60 years). At the completion of the decommissioning, the license and property are transferred back to the original licensee for spent fuel management (e.g., Zion, Lacrosse, and Crystal River).
4) The Permanent License Transfer Model: The licensee for the reactor when it was operating requests a transfer of the 10 CFR Part 50 license as part of an asset sale of the nuclear power plant, associated land, and spent fuel to a decommissioning company for accelerated decommissioning and spent fuel management (e.g., Vermont Yankee, Oyster Creek, and Pilgrim).

Three attributes of these models introduce new information and approaches that may not have been contemplated when the current regulatory framework was developed:

1) The significant acceleration of decommissioning schedules, which may accelerate withdrawals from decommissioning trust funds (DTF) and, in conjunction with reactors

ceasing operation before their licenses expire, may challenge previous assumptions regarding the time available for DTFs to grow without contributions; and

2) The conduct of decommissioning by non-utility, limited liability companies that are dedicated to decommissioning and may have financial assurance instruments that are significantly different than those available to traditional regulated electric utilities to finance decommissioning and ongoing spent fuel management expenses. It is recognized that non-utility merchant plants have been operating since the 1990s.

3) Recent changes in the energy market has resulted in more nuclear power plants shutting down and entering decommissioning sooner than originally expected.

After reviewing the current NRC regulations and policy statements with respect to these attributes, the WG determined that the current NRC regulations and policy statements continue to provide the means for NRC staff to determine whether there is reasonable assurance of sufficient funding for reactor decommissioning. The WG recommends enhancements to the NRC reactor decommissioning financial assurance guidance and procedures implementing the licensing and oversight processes to improve program effectiveness, efficiency, and transparency.

Objectives:

The objectives of this report are to:

I. Summarize the current reactor decommissioning financial assurance regulations and independent analysis and oversight processes.

II. Identify any gaps in the regulations or gaps in the independent analysis and oversight processes that would preclude the reactor decommissioning program from continuing to provide reasonable assurance of adequate funds for decommissioning.

III. Identify any potential enhancements to improve the efficiency, effectiveness, and transparency of the reactor decommissioning program.

IV. Identify any unique planning or resource considerations related to the anticipated future reactor decommissioning landscape.

V. Make recommendations to address any identified gaps or enhancements including recommending changes to applicable independent analysis and oversight guidance such as Office Instructions, Inspection Manual Chapters, etc.

I. Current Reactor Decommissioning Financial Assurance Regulations, Independent Analysis and Oversight Processes

1. Current Regulations

The current regulations governing reactor decommissioning financial assurance were developed through the following rulemakings, which are described in more detail in Appendix B.

1988 "General Requirements for Decommissioning Nuclear Facilities"

In 1988, the NRC established technical and financial requirements to ensure that the decommissioning of all licensed facilities would be accomplished in a safe and timely manner and that adequate licensee funds would be available for this purpose (Volume 53 of the *Federal Register (FR),* page 24018 (53 FR 24018); June 27, 1988).

1996 "Decommissioning of Nuclear Power Reactors"

In the 1996 final rule*,* "Decommissioning of Nuclear Power Reactors" (61 FR 39278), the NRC amended its regulations for reactor decommissioning to clarify ambiguities, codify procedures that reduce regulatory burden, provide greater flexibility, and allow for greater public participation in the decommissioning process. 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 facilitating public involvement.

1998 "Financial Assurance Requirements for Decommissioning Nuclear Power Reactors"; 2002 "Decommissioning Trust Provisions"

In 1998 and 2002, the NRC amended its 10 CFR 50.75 regulations on reactor decommissioning financial assurance to respond to the potential rate deregulation in the power generating industry and to increase assurance that an adequate amount of decommissioning funds will be available for their intended purpose (63 FR 50465; September 22, 1998, 67 FR 78332; December 24, 2002).

*2011 "*Decommissioning Planning"

In 2011, the NRC further amended its regulations to improve decommissioning planning and to reduce the likelihood that any current operating facility would be unable to complete decommissioning (76 FR 35512; June 17, 2011).

Summary of Current Regulations:

The NRC's regulations provide, in part, a time limit for decommissioning, the standards for license termination, that licensees must continually calculate and cover the estimated cost of decommissioning, that, if decommissioning costs are covered by a DTF, the management of the fund must adhere to specific standards, that expenditures from DTFs are limited, that licensees must regularly report to the NRC regarding amounts in DTFs, and that licensees must report decommissioning schedules and significant changes to those schedules.

2. *Current Licensing Processes:*

In accordance with 10 CFR 50.75 and 10 CFR 50.82, power reactor licensees are required to provide adequate financial assurance, regularly update their financial assurance, and regularly report to the NRC regarding their financial assurance. Combined with the NRC's independent financial analysis, which is considered a licensing process, and NRC's oversight process, described in the next section, they provide reasonable assurance that funds will be available for decommissioning from the beginning of operation to license termination.

Decommissioning Planning:

Establishing and maintaining decommissioning financial assurance for power reactor licensees consists of six steps:

1. Selection of financial assurance mechanism and certification of financial assurance

Mechanism: Allowable mechanisms include:

1) Prepayment
2) An external sinking fund (i.e., DTF)
3) A surety, insurance, or guarantee
4) A statement of intent (only for Federal, State, or local government licensees)
5) A contract
6) A combination of the above or other equivalent mechanism

Certification: 10 CFR 50.75(b) requires a power reactor applicant for or holder of an operating license to submit a decommissioning report that must contain a certification that financial assurance for decommissioning will be provided in an amount at least equivalent to the formula amount of 10 CFR 50.75(c).

2. Adjustments and reporting of certification amount

Adjustments: 10 CFR 50.75(c) establishes the minimum decommissioning funding assurance (DFA) based on reactor type and power level, and includes adjustment factors for labor, energy, and waste disposal costs to escalate the DFA to the current year. Annual energy and labor adjustments utilize data from the U.S. Bureau of Labor Statistics, and waste disposal adjustments rely on NUREG-1307, "Report on Waste Burial Charges: Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities."

Reporting:

At least every two years (or annually if within five years of the projected end of operations, if operations have already ceased, or where conditions have changed such that the reactor will be prematurely shutdown within five years, or if a license renewal or transfer is under NRC review), licensees must submit a decommissioning funding status (DFS) report to the NRC, which is reviewed by the NRC's Financial Assessment Branch in the Division of Rulemaking, Environmental, and Financial Support (NMSS/REFS/FAB). The DFS reports cover the preceding calendar year and must be submitted by March 31. The FAB staff performs an independent analysis to determine whether licensees have provided reasonable assurance that sufficient funding for radiological decommissioning of the reactor and site will remain available until license termination. The DFS reports are analyzed in accordance with Office Procedure LIC-205, Revision 6, "Procedures for NRC's Independent Analysis of Decommissioning Funding Assurance for Operating Nuclear Power Reactors and Power Reactors in Decommissioning," dated April 10, 2017 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML17075A095)

For operating reactors, biennial DFS reports are required to include, at a minimum, seven items (10 CFR 50.75(f)):

1) The adjusted 10 CFR 50.75(c) formula amount as of December 31
2) The amount of decommissioning funds accumulated as of December 31
3) A schedule of amounts remaining to be collected
4) A discussion of any assumptions used regarding rates of escalation in decommissioning costs, rates of earnings on decommissioning funds, and rates of other factors used in funding projections
5) A description of any contracts being utilized to provide financial assurance

6) A description of any modifications to the licensee's current method of providing financial assurance since the last submitted DFS report
7) A description of any material changes to trust agreements since the last submitted DFS report

3. Preliminary Cost Estimate

Licensees are required to submit a preliminary decommissioning cost estimate about five years prior to the projected end of operations, in accordance with 10 CFR 50.75(f). Licensees must include plans to adjust funding levels, if necessary, to provide a reasonable level of financial assurance that funds will be available to cover the cost of decommissioning.

The preliminary decommissioning cost estimate includes a comparison to the minimum decommissioning funding amount based on the formulas in 10 CFR 50.75(c). NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors," provides additional guidance on the information that is to be addressed in the preliminary decommissioning cost estimate.

4. Adjustments and reporting of certification amount

For reactors in decommissioning, annual DFS reports are required to include, at a minimum, seven items (10 CFR 50.82(a)(8)(v)):

1) The amount spent on decommissioning in the previous calendar year as well as cumulatively
2) The remaining balance of any decommissioning funds
3) The amount of funds provided by any other financial assurance methods being relied upon
4) An estimate of the remaining cost to complete radiological decommissioning, which reflects the difference between actual and estimated costs for work performed during the previous year
5) The decommissioning criteria upon which the estimate is based
6) Any modifications to the current method of providing financial assurance since the last DFS report
7) Any material changes to trust agreements or financial assurance contracts

5. PSDAR and site-specific cost estimate

The regulations at 10 CFR 50.82(a)(4)(i) require a site-specific decommissioning cost estimate (DCE) to be submitted as part of the PSDAR, which must contain a description of the planned decommissioning activities along with a schedule for their accomplishment.

6. License Termination Plan (LTP)

The regulations at 10 CFR 50.82(9) require the licensee to submit an LTP at least two years before termination of the license. The LTP must include an updated site-specific DCE of remaining decommissioning costs.

Funding Shortfalls at Power Reactors in Decommissioning:

If, for power reactors in decommissioning, the DFS report analysis reveals a projected shortfall in the amount of remaining funds to complete decommissioning, the licensee is required to

include additional financial assurance to immediately cover the identified shortfall in accordance with 10 CFR 50.82(a)(8)(vi), which states:

> If the sum of the balance of any remaining decommissioning funds, plus earnings on such funds calculated at not greater than a 2 percent real rate of return, together with the amount provided by other financial assurance methods being relied upon, does not cover the estimated cost to complete the decommissioning, the financial assurance status report must include additional financial assurance to cover the estimated cost of completion.

Section 161i. of the Atomic Energy Act of 1954, as amended, provides that, in the performance of its functions, the Commission is authorized to prescribe such regulations or order as it may deem necessary to "ensure that sufficient funds will be available for the decommissioning of any production or utilization facility…, including standards and restrictions governing the control, maintenance, use, and disbursement by any former licensee under this Act that has control over any fund for the decommissioning of the facility…." Similarly, 10 CFR 50.75(e)(vi) states, in part, that NRC reserves the right to take steps in order to ensure a licensee's adequate accumulation of decommissioning funds: review, as needed, the rate of accumulation of decommissioning funds; and, take additional actions as appropriate, on a case-by-case basis, including modification of a licensee's schedule for the accumulation of decommissioning funds.

Decommissioning Financial Assurance Spot Check Program:

The NRC may conduct periodic independent reactor decommissioning trust fund oversight analyses (spot-checks) of licensee bank statements, as needed. The intent is to improve efficiency, effectiveness, consistency, and timeliness in confirming that DFS reports, filed by licensees with the NRC, do not contain inadvertent mistakes or, in the worst case, inaccurate or false information.

In January 2008, the NRC staff implemented a decommissioning financial assurance spot-check program as a means to validate the accurate reporting of licensee decommissioning trust fund balances and compliance with existing decommissioning funding assurance requirements. Through a series of site-visits and financial statement reviews between April 2008 and June 2014, the staff sampled over 100 licensee decommissioning trust fund account statements at operating reactors for discrepancies in reporting. The staff's reviews did not reveal any significant reporting discrepancies; therefore, the staff recommended to the Commission to use the program only on an as-needed basis.

In the Staff Requirements Memorandum (SRM) on SECY-15-0005, "Recommendation to Sunset the Decommissioning Trust Fund Spot-Check Program" (ADAMS Accession No. ML15058A111), dated February 26, 2015, the Commission approved the staff's recommendation to modify the spot-check program from its current fleet-wide implementation to perform spot-checks on an as-needed basis. The current spot check program is described in LIC-205, in Appendix H.

Spot-Check Process for Operating Reactors:

Factors to be considered by the staff as a basis to perform an as-needed spot-check include:

1) A licensee (or its representatives) is indicted or convicted of fraudulent financial activities; or

2) A licensee or parent company declares bankruptcy per Chapter 7 or 11 of the U.S. Bankruptcy Code; or
3) A licensing action (e.g., license transfer) reveals a significant decline in a licensee's trust fund balance that may have an adverse impact on decommissioning activities; or
4) The staff substantiates an allegation of licensees misrepresenting decommissioning trust fund balances or making improper withdrawals from the trust fund.

LIC-205, Appendix H contains a detailed procedure for conducting spot checks at operating power reactors, including training, establishing contacts, planning and preparation, DFS report review, onsite documentation review, determination of potential issues, requesting additional information, resolution of issues (if applicable), and documentation of the review process.

The operating reactor spot check program has not been utilized since the establishment of the as-needed process. The bankruptcy trigger criteria have been met for more than one licensee, but spot checks were not performed. In these cases, the FAB staff already had sufficient information regarding the licensee's financial status, such that the spot check program was not needed to assess the adequacy of the DTF and the licensee's financial condition.

Summary of Current Licensing Processes:

The WG determined that the decommissioning financial assurance requirements and their enforcement, such as the DFS submission and review process, are sufficient to validate adequate financial assurance resources for all reactors, including reactors in decommissioning and merchant plants and limited liability companies. However, the WG did identify areas where the FAB process could be better integrated with the inspection component of the program, which are described in Section V of this report.

3. Current Oversight Processes

Regulations governing the inspection oversight of reactor decommissioning financial assurance are contained in 10 CFR 50.75 and 10 CFR 50.82. Past inspection practices have included:

1. Reviewing DFS reports and comparing them with prior DFS reports
2. Reviewing screenings conducted by licensees to determine whether thresholds in 10 CFR 50.82(a)(6) and (7) might be challenged
3. Reviewing notices of disbursements from DTFs

NRC Inspectors have utilized Inspection Procedure (IP) 36801, "Organization, Management, and Cost Controls at Permanently Shutdown Reactors" (https://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/ip36801.pdf), dated August 11, 1997, to guide their inspection practices. The current version of IP 71801, "Decommissioning Performance and Status Reviews at Permanently Shutdown Reactors" (https://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/ip71801.pdf), dated August 11, 1997, does not mention financial assurance reviews specifically. However, IP 71801 does contain a section on the Status of Decommissioning, which includes documentation of ongoing and planned decommissioning activities, and the conduct of decommissioning as compared to PSDAR or LTP schedules. Historically, financial assurance reviews conducted by inspectors have been very limited in scope and frequency. This is due, in part, to the fact that the decommissioning of merchant plants (i.e., plants where the license is held by a non-utility company, such as a limited liability company) are relatively recent occurrences. The first merchant plant to permanently shut down was Kewaunee in 2013, and the first transfer of a license for a plant in decommissioning to a non-utility company was for Zion in 2010. Prior to this, the licenses for

reactors in decommissioning were held by electric utilities, as defined in 10 CFR 50.2, which may have financial assurance instruments that are significantly different than those available to merchant plants.

On March 6, 2018, the NRC issued revised Inspection Manual Chapter (IMC) 2561, "Decommissioning Power Reactor Inspection Program" (ADAMS Accession No. ML17348A400) and commenced updates to the IMC's core inspection requirements IPs as an overall update to the reactor decommissioning inspection program. Some of the IP updates have been completed, while others are ongoing. The completed IP updates include the addition of inspection guidance for post-operational or early decommissioning inspections. As part of the overhaul, one inspection procedure, IP 36801, was identified as being largely duplicative or having similar inspection areas as other IPs within the IMC 2561 framework. IP 36801 was compared with the similar language in other IPs to ensure that no inspection guidance would be lost if it were eliminated. In cases where IP 36801 provided superior guidance, its text was relocated to the appropriate IP. As part of this process, the financial assurance section of IP 36801 is intended to be included in a revision to IP 71801. A draft of this language was developed shortly prior to the establishment of the WG. This revision was initially reviewed by the WG, but the work on the revision was suspended pending the outcome of the WG efforts. The draft provisions included significant changes to the inspection procedures associated with financial assurance, consistent with, but not as complete as, the recommendations of the WG described later in this report.

Summary of Current Oversight Processes:

During the deliberations of the WG, the members of the WG representing NRC regional inspectors expressed a strong desire for decommissioning financial assurance inspection requirements to be realistic, reasonable, and measurable. They also requested inspector training regarding the acceptable use of decommissioning trust funds. Finally, they requested a spot check program for decommissioning reactors with at least one of the triggering mechanisms relating to decommissioning progress, status, and projected completion.

II. Potential gaps in the regulations or gaps in the licensing and oversight processes that would preclude the reactor decommissioning program from continuing to provide reasonable assurance of adequate funds for decommissioning

After reviewing the applicable NRC regulations and policy statements, the WG determined they continue to provide the means for NRC staff to determine whether there is reasonable assurance of sufficient funding for reactor decommissioning throughout the lifecycle of the facility. This determination is supported by the following:

(1) The cost of decommissioning must be calculated (and be at least as much as the formula amount in 10 CFR 50.75) and updated annually until the license is terminated.

(2) Each year until the license is terminated, the cost to complete decommissioning must be covered. If the cost is covered by setting aside funds periodically in a DTF, the licensee is limited to using a 2-percent (%) annual real rate of return and, when using the formula amount, must calculate that the amount is accumulated by the time of permanent cessation of operations (even though the licensee has 60 years thereafter to complete decommissioning).

(3) A trustee (as opposed to the licensee) manages the DTF according to a written trust agreement for which the NRC has oversight. The trustee is prohibited from investing in securities or obligations of the licensee or its affiliates and is obligated to adhere to a prudent investor standard of care. Additionally, the trust agreement may not be amended in any material respect without written notification to the NRC with 30 working days to object.

(4) The licensee must notify the NRC at least 30 working days before making withdrawals from DTFs while the facility is operating and may not withdraw if the NRC objects.

(5) The scope of allowable withdrawals is limited: withdrawals can only be for radiological decommissioning costs, with a limit on withdrawals of 3% while operating and 20% while in decommissioning but before submitting a DCE to the NRC. Additionally, no withdrawals are allowed that would inhibit the availability of funds to ultimately release the site and terminate the license.

(6) There are periodic reporting requirements and requirements to make up shortfalls:

1) For operating plants, biennial reports and obligation to make up shortfalls in two years for non-utility plants or five years for utility plants.
2) For plants within five years of shutdown, annual reports and obligation to make up shortfalls in two years for non-utility plants or five years for utility plants.
3) For plants in decommissioning, annual reports and obligation to make up shortfalls immediately.

(7) The licensee is required to provide a preliminary decommissioning cost estimate to the NRC at or about five years prior to the projected end of operations and a site-specific DCE to the NRC prior to or within two years following permanent cessation of operations. The licensee must notify the NRC before making any changes to decommissioning actions and schedules described in the PSDAR that would significantly increase the decommissioning cost.

(8) The licensee is allowed 60 years to complete decommissioning, which allows for any potential shortfalls in DTFs identified in annual reports to be made up by fund growth if no other make-up funds are available.

(9) The NRC may revoke any exemption for the use of DTFs for purposes other than radiological decommissioning, if a licensee could not otherwise satisfactorily make up a significant shortfall.

III. Potential enhancements to improve the efficiency, effectiveness, and transparency of the reactor decommissioning program

The WG did not identify any gaps in the regulations or in the licensing processes that would preclude the reactor decommissioning program from continuing to provide reasonable assurance of adequate funds for decommissioning. Additionally, the WG believes that improvements to the oversight program that are in development should continue. Also, the WG identified potential enhancements to improve the efficiency, effectiveness, and transparency of the reactor decommissioning program. These enhancements were developed by the WG as well as in consideration of stakeholder concerns.

1. *Working Group Deliberations:*

When the WG commenced its program evaluation, the NRC staff was in the process of completing the ongoing revision to the affected inspection procedures (i.e., IP 36801, which is to be incorporated into IP 71801). These proposed revisions would clarify the expectations for inspectors at decommissioning facilities to reduce the potential need for inspectors to conduct financial assessments of decommissioning activities. However, as the WG's deliberations progressed, it identified other possible approaches to the IP revisions for consideration.

One approach that the WG considered was to retain and clarify expectations for inspectors to conduct financial assessments in the field. This approach would require significant additional training in an area generally outside the expertise of most inspectors and would create a review that would be largely duplicative of the work already being done or capable of being done by FAB financial analysts.

Another approach that the WG considered was to eliminate the financial assurance inspections completely and rely solely on FAB assessments of the annual DFS reports. This approach would avoid a significant overhaul of inspector training and qualification but would be inconsistent with a prior NRC policy statement and contrary to the NRC mission to protect people and the environment. Specifically, the "Final Policy Statement on the Restructuring and Economic Deregulation of the Electric Utility Industry," dated August 19, 1997 (62 FR 44071) states, "the NRC continues to believe that its primary tool for evaluating and ensuring safe operations at its licensed facilities is through its inspection and enforcement programs." Relying on just the FAB reviews of DFS reports would eliminate the use of this tool for financial assurance reviews. Further, this approach would preclude the possibility of utilizing inspections to provide more timely and direct observational insight into the decommissioning performance of the new business model licensees.

The WG did not consider leaving IP 36801 unchanged for two reasons. First, the ongoing revision to IP 36801 was part of an update to all of the IPs in IMC 2561. As part of this overall review, IP 36801 was identified as largely duplicative. Relevant portions of IP 36801 were relocated elsewhere or eliminated based on duplication with an existing IP. Secondly, the need to revise the financial assurance sections of the IP had already been identified and constituted the majority of the revision which was subsequently placed on hold by the establishment of the WG.

Additionally, as deliberations progressed, the WG identified and began developing additional potential program enhancements which would require additional changes to the IP. These proposed program enhancements are areas where additional or revised guidance may improve the overall efficiency, effectiveness, and transparency of the decommissioning program by providing better integration of oversight and licensing activities, clarifying roles and responsibilities, and improving communications and understanding of the overall regulatory oversight approach.

2. *Stakeholder Perspectives:*

The WG conducted a WEBEX on February 5, 2020, which had over 100 participants. From the WEBEX and other public comments, the WG identified several stakeholder suggestions that merited further consideration by the WG:

Periodic Cost-Baselining: Stakeholders suggested that the WG consider comparing site-specific cost estimates to the actual costs ultimately incurred in order to provide assurance of the adequacy of current cost estimate processes. The WG plans to further consider this item as part of the guidance update initiatives discussed below in section V.1.

Consider Future Costs: Stakeholders expressed concerns about cost estimates incorporating future costs as part of the cost estimates. The WG determined that future costs are already considered as part of the current decommissioning financial assurance process. Specifically, as part of their DFS reports, licensees are required to regularly update their decommissioning cost estimates based on current information.

Consider additional funding requirements for limited liability companies: Stakeholders also suggested that the WG investigate options to compel limited liability companies to cover potential future shortfalls in decommissioning funding. The WG determined that the NRC's regulations already require all licensees, including limited liability companies, to cover any identified shortfalls. Additionally, because the regulations also require regular recalculations of decommissioning costs based on current information, the WG determined that any shortfall would be identified far enough in advance that actions could be taken to cover the shortfall, such as by allowing additional fund growth or by revoking any exemption previously granted by the NRC for the licensee to use decommissioning funds for spent fuel management.

DTF Residuals: Stakeholders suggested that the WG should prohibit exemption requests by licensees to use decommissioning trust funds for purposes other than radiological decommissioning (i.e., for spent fuel management and for site restoration) such that any funds left over after radiological decommissioning (i.e., DTF residuals) could be used for purposes advocated by the stakeholders, such as being distributed to ratepayers. However, when considering exemption requests, including requests for exemptions to the requirement that decommissioning trust funds be used for radiological decommissioning, the NRC is bound by 10 CFR 50.12, which states that exemption requests may be granted if, among other things, they are authorized by law. Therefore, whether a licensee may be granted an exemption to use a specific DTF to cover costs other than radiological decommissioning is a case-by-case determination of whether, for that specific fund, covering those costs would be authorized by law. For this reason, the WG determined that, instead of creating a generic rule as suggested by the stakeholders, it would be better to continue analyzing this issue on a case-by-case basis as part of the exemption request process.

Department of Energy Reimbursements to the Licensee: Stakeholders suggested that the WG should require, if licensees are granted an exemption to use decommissioning trust funds for spent fuel management, that the licensees must return any reimbursements received from the Department of Energy (DOE) for spent fuel management expenses to the DTF. Stakeholders suggested NRC use the threat of voiding an exemption for use of the DTF for spent fuel management to compel licensees to apply any DOE reimbursements to the DTF.

The WG determined that the NRC only grants exemptions to use decommissioning trust funds for spent fuel management when the licensee has demonstrated to the NRC that,

even after using the DTF for spent fuel management and not relying on any reimbursements from the DOE, the DTF will have sufficient funds to also completely cover radiological decommissioning. Since the DTF will have sufficient funds to cover radiological decommissioning and spent fuel management without relying on any DOE reimbursements, there is no public health and safety justification for the NRC to require that the licensee return any DOE reimbursements to the DTF.

However, when a licensee is granted an exemption to also use the DTF for spent fuel management, the NRC regularly monitors that the DTF is sufficient to cover both radiological decommissioning and spent fuel management. If, at any point, the NRC's prior determination that the DTF was sufficient to cover both radiological decommissioning and spent fuel management is challenged, then the NRC may revoke the exemption, or the licensee would have to otherwise ensure adequate funds are available. Therefore, the WG determined that no additional action was necessary on this suggestion.

DTF Shortfall: Stakeholders expressed concerns about how the NRC would address potential shortfalls in the DTF, especially in the case of bankruptcy by the licensee. As discussed above, the WG determined that, because the regulations require regular recalculations of decommissioning costs based on current information, any shortfall would be identified far enough in advance that actions could be taken to cover the shortfall, such as by allowing additional fund growth or by revoking any exemption previously granted by the NRC for the licensee to use decommissioning funds for spent fuel management. Additionally, a bankruptcy filing does not relieve a licensee of its obligation to comply with NRC regulations. Licensees must continue to comply with the NRC's decommissioning financial assurance requirements, including the requirement to make up shortfalls.

The WG considered two instances of licensee bankruptcy occurring prior decommissioning, and determined that in both cases, the DTF was protected and sufficient to provide reasonable assurance of adequate resources to complete radiological decommissioning. If a licensee were to enter bankruptcy during decommissioning, a potential shortage in the DTF would likely result in a work stoppage, to allow time for remaining funds to grow to accommodate completion of radiological decommissioning.

PSDAR Update Triggers: A stakeholder suggested that the NRC provide guidance regarding the requirement at 10 CFR 50.82(a)(7) for licensees in decommissioning to notify the NRC in writing of "changes that significantly increase the decommissioning cost." The WG agrees that it would be helpful to provide guidance to assist licensees in making significance determinations on decommissioning cost increases and will consider incorporating relevant guidance as part of the proposed updates to Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning of Nuclear Reactors," dated October 2011 (ADAMS Accession No. ML112160012). The WG plans to further consider this item as part of the guidance update initiatives discussed below in section V.1.

IV. Identify any unique planning or resource considerations related to the anticipated future reactor decommissioning landscape.

As discussed above, the potential for non-utility companies (*i.e.*, merchant plants or limited liability companies) to conduct decommissioning has been considered as part of the NRC's decommissioning financial assurance regulations. However, consideration of the anticipated future decommissioning landscape requires consideration of expected and possible future shutdowns and continued or increasing use of the license transfer models and the accompanying accelerated decommissioning schedules. Given the anticipated continuance of license transfer decommissioning approaches, the WG explored several potential program enhancements in order to increase the reactor decommissioning financial assurance program's effectiveness, efficiency, and transparency. Specifically, the WG's enhancements sought to accomplish five main objectives: 1) integrate inspection and financial analysis functions in a holistic and complementary way, 2) eliminate possible duplication of effort in conducting financial reviews, 3) provide a method to monitor licensee's decommissioning activities in between annual DFS reports, 4) provide a mechanism and procedure to initiate a more rigorous review of licensee's decommissioning expenditures during active decommissioning activities, and 5) establish a process for incorporating collaboration into the program across organizational/regional boundaries, utilizing a recurring training activity.

The WG's schedule to implement the proposed enhancements was developed with the expectation that no additional resources would be needed to develop the revised guidance and develop a training program. Similarly, no additional resource needs were identified to implement the proposed enhancements. However, should the currently mandated agency work-at-home requirements continue, it is possible that the schedule may change for the guidance development and implementation of a training program. Additionally, implementation could be delayed if the current projections for future power reactors permanently shutting down increases or the number of expected license transfer applications increases. After the enhancements are implemented, there could be a need for additional financial assessment resources if there was a corporate level concern for a limited company involved in multiple decommissioning sites, resulting in a need for a large number of spot checks.

V. Recommended Enhancements to Licensing and Oversight Guidance Documents

To achieve the five objectives discussed above, the WG identified the following enhancements to improve the efficiency, effectiveness, and transparency of licensing and oversight of the reactor decommissioning financial assurance program.

The WG recommends that an a group of internal stakeholders that includes staff from the Regional Decommissioning Branches within their Divisions of Nuclear Materials Safety Reactor offices (RI, RIII, and RIV DNMS), the Reactor Decommissioning Branch in the Division of Decommissioning, Uranium Recovery, and Waste Programs (NMSS/DUWP/RDB), and NMSS/REFS/FAB be tasked to develop an update to existing

guidance contained in Office Instruction LIC-205,[1] Revision 6, "Procedures for NRC's Independent Analysis of Decommissioning Funding Assurance for Operating Nuclear Power Reactors and Power Reactors in Decommissioning," dated April 10, 2017 (ADAMS Accession No. ML17075A095); Inspection Procedure 71801, "Decommissioning Performance and Status Reviews at Permanently Shutdown Reactors" (https://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/ip71801.pdf), dated August 11, 1997; and Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning of Nuclear Reactors," dated October 2011 (ADAMS Accession No. ML112160012) as described below.

At the direction of the WG Steering Committee, the WG consulted with backfit experts in the Office of Nuclear Reactor Regulation (NRR) to understand any potential backfit considerations. It was agreed that while the enhancements need to be thoughtfully developed, there were no immediate concerns related to backfit under 10 CFR 50.109, for two main reasons: 1) There is not a direct safety nexus for decommissioning funding assurance activities, and 2) the enhancements do not meet the definition of backfitting as provided in 10 CFR 50.109(a)(1).

1. *Clarify Oversight of DTF Expenditures as Part of Reviews of Annual Decommissioning Funding Status Reports*

   10 CFR 50.82(a)(8)(v) states that annual DFS reports must include the following information, on a calendar year basis, by April 1 of the following year:

   (A) The amount spent on decommissioning, both cumulative and over the previous calendar year, the remaining balance of any decommissioning funds, and the amount provided by other financial assurance methods being relied upon;

   (B) An estimate of the costs to complete decommissioning, reflecting any difference between actual and estimated costs for work performed during the year, and the decommissioning criteria upon which the estimate is based;

   (C) Any modifications occurring to a licensee's current method of providing financial assurance since the last submitted report; and

   (D) Any material changes to trust agreements or financial assurance contracts.

   RECOMMENDATION: Guidance should make clear that the requirement to report the amount spent on decommissioning means that the amount should be broken down by decommissioning activity. Thus, the DFS reports should itemize expenses similar to

[1] Note that prior to the formation of the Center of Expertise - Financial (COE-F or COE), the majority of the Financial Assessment Branch (FAB) functions, including decommissioning funding oversight, resided in the Office of Nuclear Reactor Regulation (NRR) in the Financial Projects Branch (PFP). As such, the procedures for reviewing decommissioning funding status reports for operating reactors and reactors in decommissioning are described in NRR Office Instruction, LIC-205, Revision 6, "Procedures for NRC's Independent Analysis of Decommissioning Funding Assurance for Operating Nuclear Power Reactors and Power Reactors in Decommissioning." With the formation of the COE-F in NMSS, and the associated relocation of PFPB into the COE-F as FAB, essentially the functions of FAB also moved from NRR to NMSS. Accordingly, FAB function-related guidance, such as LIC-205, should, to the greatest extent possible, be consolidated into NMSS guidance format. FAB staff currently intends to propose changes to LIC-205 that are outside of those proposed by the WG. Therefore, any changes to the decommissioning funding status review procedure, whether outside of or related to the WG proposal, can be drafted into the LIC-205 text and implemented in a new, NMSS-specific guidance document (e.g. P&P).

how such expenses are presented in licensees' site-specific decommissioning cost estimates. The desired outcome is for licensees to present this information in a manner that allows the NRC licensing and oversight staff to make informed decisions on the usage of the Decommissioning Trust Funds. NRC guidance should be revised to clearly specify the level of detail expected in DFS reports.

Having DFS reports consistently itemize expenses for decommissioning activities would improve the efficiency of NRC staff reviews of the reports, allow for better coordination between headquarters financial reviewers and regional staff regarding decommissioning financial assurance (see Item 4), and inform a potential financial assurance spot check program for reactors in decommissioning (see Item 5).

Based on stakeholder feedback, there may be industry concerns with these proposed clarifications. However, the WG envisions that these clarifications would only require licensees to present the information in their DFS reports consistent with how that information is already typically reported in site-specific decommissioning cost estimates (*i.e.*, itemized). Additionally, such itemization is already subject to NRC oversight as described in IP 36801 in Section 2.04.

It is anticipated that various sections of Office Instruction LIC-205 would require modification in Chapters 4 and 5 and Appendix C, including:

- Section 4.2 Coordination with Offices
  - To describe the expected interactions with Regional offices to confirm described completed decommissioning activities have been verified (see item 3 below)
- Section 4.3.6.B Determine Reasonable Assurance,
  - Licensee is providing assurance using a SSCE [site-specific cost estimate]
  - To describe how to review information to inform reasonable assurance determination
- Section 4.4.4 Determine Reasonable Assurance
  - Ties directly to 4.3.6.B
- Chapter 5 Responsibilities and Authorities
  - To incorporate reviews with regional inspection staff
- Appendix C, Datasheets
- To provide means to document review of new data.

Regulatory Guide 1.159 would be modified at Section 2.6, "Biennial Reports," to include the level of detail described in Section 1.3, "Decommissioning Cost Estimates," consistent with major level cost estimate information in Regulatory Guide 1.202, "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," dated February 2005; and NUREG-1713, "Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors," dated October 2004.

It is anticipated that these changes could be incorporated into a revision of Office Instruction LIC-205 by the end of calendar year 2020, and into Regulatory Guide 1.159 by the end of fiscal year 2021.

2. *Periodic Cost-Baselining:*

   RECOMMENDATION: Develop guidance for future periodic cost-baselining. The WG also received stakeholder feedback that the NRC should review completed decommissioning projects to validate or make adjustments to the cost estimating process based on a comparison of site-specific cost estimates to actual costs ultimately incurred. The WG considers that a review would be appropriate after more actual cost data under the new business models are available.

   This future evaluation will be incorporated into LIC-205 in Section 6, "Performance Measures," and would enhance validation of the review assumptions utilized by the NRC staff.

   It is anticipated that this change could be incorporated into a revision of Office Instruction LIC-205 by the end of calendar year 2020.

3. *Develop 30-Day Notification Guidance*[2]

   RECOMMENDATION: Develop guidance for the level of detail to be provided in the 30-day notices required by 10 CFR 50.75(h)(1)(iv) and (h)(2) or license conditions. Also, develop internal processes so that 30-day notices promptly reach the attention of appropriate reviewers.

   During the course of its deliberations, the WG identified this as an area where a lack of specific guidance has resulted in an inconsistent level of detail in licensee submittals, as well as some delays in submittals reaching appropriate analysts in a timely manner. The WG envisions that the level of detail provided would be consistent with that specified for the DFS reports.

   Responsibility for changes to guidance would be with REFS/FAB staff. Guidance documents to be modified include LIC-205 and Regulatory Guide 1.159, Revision 2, "Assuring the Availability of Funds for Decommissioning of Nuclear Reactors," dated October 2011.

   It is anticipated that the guidance would be incorporated in new sections of Office Instruction LIC-205 and Regulatory Guide 1.159. It is anticipated that these changes could be incorporated into a revision of Office Instruction LIC-205 by the end of calendar year 2020 and Regulatory Guide 1.159 by the end of fiscal year 2021.

4. *Revise Inspection Procedures*

   RECOMMENDATION: Revise current financial assurance sections of IP 36801[3] to clarify expectations for the oversight of decommissioning financial assurance.

[2] The 30-day notification requirement typically does not apply to reactors that are permanently shut down, (see 10 CFR 50.75(h)((1)(iv), "After decommissioning has begun and withdrawals from the decommissioning fund are made under §50.82(a)(8), no further notifications need to be made to the NRC.)

[3] Note: IP 36801 is currently slated for elimination as part of an overall update of decommissioning inspection procedures seeking to identify and eliminate redundancies. As part of this process, the financial provisions of IP 36801 are being relocated to IP 71801.

Revisions to the IP will:

- Remove sections related to reviewing detailed licensee decommissioning cost information and reports and decommissioning financial assurance. Instead, inspectors will record in periodic inspection reports all major on-going and completed decommissioning activities. The expenditures supporting these activities will be described in the licensee's DFS reports, using the revised guidance described in item 1, and be subject to review by NMSS/REFS/FAB financial analysts.
- Provide direction for inspectors to make inquiries as to overall financial status of decommissioning (e.g., Did the scope of work change significantly? Was there a significant change in the decommissioning strategy or approach? Were there significant unexpected delays in accomplishing planned activities? Significant could be defined as an increase in resources of 150-200%, for example, which would then prompt the inspector to contact the NMSS PM). Also, inspectors will determine compliance with 10 CFR 50.82(a)(7).
- Include a review of the licensee's financial allocation control process to ensure that it allows only appropriate withdrawals for decommissioning activities in accordance with 10 CFR 50.82(a)(6).
- Provide direction to refer detailed financial review related questions to NMSS/REFS/FAB for evaluation and for consideration under a new decommissioning reactor financial assurance spot check program (see Item 4).

The inspection reports generated under this procedure would be provided to NMSS/REFS/FAB financial analysts for their use as part of their review of the reasonableness of the licensee's DFS reports.

These IP revisions are the responsibility of NMSS/DUWP/RDB, with support from NMSS/REFS/FAB and Regions utilizing the IMC 0040 process.

It is anticipated that these changes could be incorporated into a revision of IP 71801 by the end of calendar year 2020.

5. *Develop Decommissioning Reactor Financial Assurance Spot Check Program*

   Decommissioning reactor financial assurance is independently analyzed every year through the NMSS/REFS/FAB financial analyst review of the DFS reports. However, there is no defined process for verifying the information provided by the licensees in these reports, in cases where circumstances warrant a more detailed evaluation of the licensee's documentation of DTF expenditures.

   RECOMMENDATION: Modify Office Procedure LIC-205 and IP 71801 to establish the procedures and process for a spot check program of the DTF for licensees of power reactors in decommissioning.

   A new section and appendix will be added to LIC-205:

   - A description of the program would be added to Section 6, "Performance Measures," to describe the purpose of the new decommissioning reactor

financial assurance spot check program, and to distinguish it from the existing analogous operating reactor financial assurance spot check program.

– A new appendix would be added to describe program implementation in detail, including initiation criteria. This new appendix would mirror existing Appendix H, which describes the existing operating reactor financial assurance spot check program.

Additional procedures would be added to IP 71801:

– The financial activities section would include a discussion of documenting observations of on-going and completed decommissioning activities in periodic Inspection Reports, including circumstances which may warrant the initiation of a decommissioning reactor financial assurance spot check (see Item 3).

– Develop Spot Check Trigger criteria

  - For example: fraudulent activities, bankruptcy, a significant decline in the trust fund balance, or a substantiated allegation.

NRC staff in NMSS/REFS/FAB and NMSS/DUWP/RDB would take coordinated lead for their respective procedures to implement complementary changes to LIC-205 and IP 71801.

It is anticipated that these changes could be incorporated into a revision of IP 71801 by the end of calendar year 2020.

The WG discussed implementation aspects of the new decommissioning reactor financial assurance spot check program. Given that financial records are typically located at the licensee's headquarters location, and not at the decommissioning site, it would be effective to develop a mechanism to conduct the spot check document reviews via data portals (e.g., use of Certrek or e-docs, etc.). Such data portals would need to be compliant with document sensitivity handling requirements. It is recommended to use the same process currently being utilized to conduct licensing reviews.

6. *Establish Decommissioning Financial Assurance Training Program*

RECOMMENDATION: Establish a training program with participation by NRC staff in Region I, III, and IV DNMS, NMSS/DUWP and NMSS/REFS to be implemented as Decommissioning Financial Assurance Workshops during the Annual Decommissioning Counterpart Meetings.

The training program comprise a joint training workshop to provide just-in-time training and establish better coordination and communication of expectations between HQ and regional staff. This would provide refresher training and reach better alignment between program office, support office (NMSS/REFS/FAB) and Regional inspection staff, which would provide more consistency and clarity of expectations for financial assurance related inspections. This training could be conducted as a separate meeting or in conjunction with the annual decommissioning counterpart meeting typically held in May on an annual basis. Participation by Management at the Division level is recommended for the training to be deemed important and effective. Possible Workshop topics for discussion include:

1. Provide a brief refresher introduction of the applicable requirements and typical real-life scenarios of active decommissioning power reactor sites to ensure that all trainees have a common understanding
2. Discuss revised inspection and reporting approach
3. Discuss implementation of Decommissioning Reactor Financial Assurance Spot Check Program
4. RDB/FAB staff as a resource for involvement with financial assurance activities during inspections
5. Review of appropriate DTF usage, including examples or case studies
6. Review of frequently asked questions related to DTF usage and decommissioning financial assurance

For the upcoming May 2020 Decommissioning Counterpart meeting, the working group believes we can have meaningful discussions on draft guidance changes to further develop their completion and implementation. It is anticipated that these new programs will continue to be discussed at subsequent counterpart meetings, as the program is implemented and matures.

7. PSDAR Update Triggers:

During the February 5, 2020 webinar, a stakeholder suggested that the NRC provide guidance regarding the requirement at 10 CFR 50.82(a)(7) for licensees in decommissioning to notify the NRC in writing of "changes that significantly increase the decommissioning cost," which triggers a required update to the facilities PSDAR. The WG agrees that it would be helpful to provide guidance to assist licensees in making significance determinations on decommissioning cost increases and proposes incorporating relevant guidance as part of the proposed updates to Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning of Nuclear Reactors," dated October 2011 (ADAMS Accession No. ML112160012).

RECOMMENDATION: Provide guidance in Regulatory Guide 1.159 of what constitutes a significant increase in decommissioning costs, as described in 10 CFR 50.82(a)(7).

It is anticipated that these changes could be incorporated into Regulatory Guide 1.159 by the end of fiscal year 2021.

8. Timing of comparison between DTF formula and SSCE.

Following completion of recent a license transfer action for decommissioning, NRC staff review observed that the formula cost estimate described in 10 CFR 50.75(c)(1) had not been compared to the site-specific cost as required at 10 CFR 50.75(b)(1). Decommissioning activities had commenced, and withdrawals made from the DTF for decommissioning costs incurred. At this point in the process, a comparison of the site-specific estimate to the formula showed the formula amount to exceed that for the remaining decommissioning work in the site-specific cost estimate because decommissioning work had been completed. After further review of the circumstances,

it was recognized that the required comparison was no longer valid after decommissioning activities had commenced.

RECOMMENDATION: Provide guidance to clarify that the 10 CFR 50.75(b)(1) requirement for a site-specific cost estimate to be more, but not less, than the 10 CFR 50.75(c)(1) formula cost estimate is only applicable at the time of plant shutdown, prior to completion of decommissioning work.

- This change would be affected by adding a footnote to Section 1.1.1 of Regulatory Guide 1.159, which discusses this comparison of cost estimates.
- This change would be included in other changes to Regulatory Guide 1.159 to be completed by the end of fiscal year 2021.

The WG also considered some items which were determined to be outside the scope of the WG's charter. After evaluation, one item will be provided to the Division of Fuel Management for further consideration and is discussed below.

9. *Provide Irradiated Nuclear Fuel Funding Guidance for use of Provisional Trust Funds*

The WG identified past practices regarding the establishment of provisional funding requirements to the licensee for spent fuel management, pending DOE reimbursements to the licensee. Licensees typically rely on estimated dates for DOE taking the spent fuel for disposal and propose irradiated fuel management fund schedules based on the estimated dates.

In the past, NRC has required the licensee to establish provisional trust funds which will be exercised if the DOE reimbursements are delayed. NRC guidance could be amended to indicated that a good practice would for the licensee to establish provisional trust funds, which would be enacted if DOE doesn't take the fuel by the licensee's estimated dates.

The WG agreed that this is a good practice, but the development of implementing guidance is outside the WG's charter.

RECOMMENDATION: The WG recommends providing this possible guidance initiative related to establishment of provisional trust funds pending DOE reimbursement to the Division of Fuel Management for their consideration.

Conclusion:

The NRC has a robust regulatory framework for power reactor decommissioning. The regulations in 10 CFR Section 50.82, "Termination of license," require that power reactor decommissioning (removing a facility or site safely from service and reducing residual radioactivity to a level that permits release of the property and termination of the license) will be completed within 60 years of permanent cessation of operations. The regulations in 10 CFR 50.75, "Reporting and recordkeeping for decommissioning planning," specify how a licensee will provide reasonable assurance that funds will be available for decommissioning from the granting of a license to the termination of the license.

After completing review, the applicable NRC regulations and policy statements, the WG determined that the existing regulatory framework provide an adequate means for NRC to determine whether there is reasonable assurance of sufficient funding for reactor decommissioning, for all known types of current reactor fleet decommissioning plans and

business models. The WG identified enhancements to guidance and procedures implementing the licensing and oversight processes that would improve program effectiveness, efficiency, and transparency.

Appendix A:

Working Group Membership

Representation	Name	Organization	Position
Chairman	Ted Smith	NMSS/DUWP/RDB	Project Manager
NMSS - Decommissioning	Bruce Watson	NMSS/DUWP/RDB	Branch Chief
SES Sponsor	Trish Holahan	NMSS/DUWP	Director
NMSS- Financial Assessment	Shawn Harwell	NMSS/REFS/FAB	Financial Analyst
	Fred Miller		Branch Chief
NRR	John Lamb	NRR/DORL	Project Manager
Region I	Steve Hamman	R-I/DNMS/DIRHB	Inspector
	Anthony Dimitriadis		Branch Chief
	Brett Klukan	Region I	Regional Counsel
Region III	Bill Lin	R-III/DMNS/MCID	Inspector
	Rhex Edwards		Inspector
	Mike Kunowski		Branch Chief
Region IV	Stephanie Anderson	R-IV/DMNS/RIB	Inspector
	Chris Steely		Inspector
	Greg Warnick		Branch Chief
OGC	Anita Ghosh Naber	OGC/GCHA/AGCOR	Senior Attorney
	Jeremy Wachutka		Senior Attorney
Administrative Support	Nadine Aridi	NMSS/DUWP	Administrative and Technical Support

Appendix B

Current Reactor Decommissioning Financial Assurance Regulations, Independent Analysis and Oversight Processes

Current Regulations

The current regulations governing reactor decommissioning financial assurance were developed through the following rulemakings.

1988 "General Requirements for Decommissioning Nuclear Facilities"

In 1988, the U.S. Nuclear Regulatory Commission (NRC) established technical and financial requirements to ensure that the decommissioning of all licensed facilities would be accomplished in a safe and timely manner and that adequate licensee funds would be available for this purpose (Volume 53 of the *Federal Register (FR),* page 24018 (53 FR 24018); June 27, 1988).

Prior to this rule, the regulations were clear that the licensee was responsible for the funding and completion of decommissioning in a manner which protects public health and safety, but they covered decommissioning in a limited way and were not fully adequate to deal with licensee decommissioning requirements effectively.

In this final rule, the NRC amended its regulations to provide specific requirements for the decommissioning of nuclear facilities. Specifically, the final rule included regulations regarding acceptable decommissioning alternatives, planning for decommissioning, decommissioning timeliness, and assurance of the availability of funds for decommissioning.

Decommissioning was defined in the 1988 final rule as "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. Therefore, decommissioning, as used in NRC regulations, refers exclusively to radiological decommissioning.

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 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 made it clear 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 sites in decommissionings [sic] 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 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 Title 10 of the *Code of the Federal Regulations* (10 CFR) Section 50.75. The 1988 final rule also imposed the requirement that five years before license expiration or cessation of operations, licensees must submit a preliminary decommissioning plan containing a site-specific decommissioning cost estimate (DCE) and appropriately adjust the financial assurance mechanism. This is also required within two years after permanent cessation of operations. For delayed dismantlement of a power reactor facility, the 1988 final rule required that licensees submit an updated decommissioning plan with the estimated cost covering the delay of decommissioning, and that the licensees 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 accrual of required decommissioning funds may be incomplete.

1996 "Decommissioning of Nuclear Power Reactors"

In the 1996 final rule, "Decommissioning of Nuclear Power Reactors" (61 FR 39278), the NRC amended its regulations for reactor decommissioning to clarify ambiguities, codify procedures that reduce regulatory burden, provide greater flexibility, and allow for greater public participation in the decommissioning process. 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 facilitating public involvement.

In the 1996 final rule, the NRC explained that the degree of regulatory oversight required for a power reactor during its decommissioning stage is considerably less than that required for the reactor during its operating stage. Specifically, the NRC stated:

> 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….
>
> 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…. 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 criteria.

With regard to initial decommissioning activities, the 1996 final rule established requirements that were similar to those in the 1988 final rule but included flexibility in the types of actions that could be undertaken without prior NRC approval. For example, the 1996 final rule established that once a licensee permanently ceases operation of the power reactor, no major decommissioning activities could be undertaken until the public and the NRC were provided additional information by the licensee. The NRC required that licensees submit this information in the form of a Post-Shutdown Decommissioning Activities Report (PSDAR), which consists of the licensee's proposed decommissioning activities and schedule through license termination, and a DCE 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 fuel has been permanently removed from the reactor vessel, the licensee can begin performing major decommissioning activities if the NRC does not offer an objection. After the NRC receives the PSDAR, a public meeting is held in the vicinity of the reactor site to discuss and solicit public feedback on the PSDAR. The 1996 final rule also amended certain 10 CFR Part 50 technical requirements to cover the transition of the facility from operating to permanently shut down status. Specifically, the 1996 final rule removed the requirement for a licensee that has permanently ceased operation and removed fuel from the reactor vessel to obtain a license amendment prior to proceeding with certain decommissioning activities within established regulatory constraints (*i.e.*, in accordance with 10 CFR 50.59, "Changes, tests and experiments").

Regarding major decommissioning activities, the 1996 final rule implemented a significant 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 NRC 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 NRC 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.

The 1996 final rule continued the same degree of decommissioning financial assurance that was previously required but provided more flexibility by allowing licensees 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. Prior to 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 DCE. The 1996 final rule permitted 3 percent of the decommissioning funds generically required by 10 CFR 50.75 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 was made available 90 days after receipt of the PSDAR. Funds in excess of these amounts could only be used after the submittal of a DCE.

1998 "Financial Assurance Requirements for Decommissioning Nuclear Power Reactors"; 2002 "Decommissioning Trust Provisions"

In 1998 and 2002, the NRC amended its 10 CFR 50.75 regulations on reactor decommissioning financial assurance to respond to the potential rate deregulation in the power generating industry and to increase assurance that an adequate amount of decommissioning funds will be available for their intended purpose (63 FR 50465; September 22, 1998, 67 FR 78332; December 24, 2002). These amendments required non-electric-utility licensees, including limited liability companies, to provide in their trust agreements that (1) the trustee is prohibited from investing the funds in securities or other obligations of the licensee and is obligated to adhere to a prudent investor standard of care, (2) the trust agreement may not be amended in any material respect without prior written notification to the NRC, and (3) while operating, no disbursement may be made from the trust without prior written notification to the NRC. Additionally, the amendments required power reactor licensees to report the status of their decommissioning funds every two years or annually for plants that are within five years of their projected end of operation.

*2011 "*Decommissioning Planning"

In 2011, the NRC further amended its regulations to improve decommissioning planning and to reduce the likelihood that any current operating facility would be unable to complete decommissioning (76 FR 35512; June 17, 2011). This was accomplished by addressing the potential vulnerability of the parent company guarantee and the self-guarantee as the financial mechanism for providing decommissioning funding assurance, when the guarantor falls into financial distress. The rule required all reactor licensees who use these guarantee mechanisms to establish a standby trust fund to receive the guaranteed financial assurance amount should that amount become immediately due and payable.

For licensees with reactors in a decommissioning status, the rule instituted additional reporting requirements for decommissioning fund status, spent fuel management costs, and estimated decommissioning costs. These new reporting requirements, in part, modified the existing PSDAR requirements set forth in 10 CFR 50.82(a)(4)(i). The additional reporting requirements included that each power reactor licensee undergoing decommissioning must submit an annual decommissioning financial status (DFS) report, as set forth in new paragraphs 10 CFR 50.82(a)(8)(v) through (a)(8)(vii). The annual DFS reports to the NRC must include, among other things, information on decommissioning expenditures made during the previous calendar year, the remaining balance of decommissioning funds, and an estimate of the cost to complete decommissioning. If there is a shortfall, the DFS report must include additional financial assurance to cover the estimated cost of completion.

Summary of Current Regulations:

The NRC's regulations provide, in part, a time limit for decommissioning, the standards for license termination, that licensees must continually calculate and cover the estimated cost of decommissioning, that, if decommissioning costs are covered by a decommissioning trust funds (DTF), the management of the fund must adhere to specific standards, that expenditures from DTFs are limited, that licensees must regularly report to the NRC regarding amounts in DTFs, and that licensees must report decommissioning schedules and significant changes to those schedules.