

**POLICY ISSUE**  
**(Information)**

June 20, 2013

SECY-13-0066

FOR: The Commissioners

FROM: Eric J. Leeds, Director  
Office of Nuclear Reactor Regulation

SUBJECT: STAFF FINDINGS ON THE TABLE OF MINIMUM AMOUNTS  
REQUIRED TO DEMONSTRATE DECOMMISSIONING FUNDING  
ASSURANCE

PURPOSE:

To provide the Commission with a response to Staff Requirements Memorandum (SRM) SECY-06-0065, "Office of the Inspector General Recommendations on Decommissioning Funding Assurance," specifically:

"In the future (circa 2011) when more cost return information is available, NRR should review the formula used for decommissioning funding requirements and adjust it, if necessary."

SUMMARY:

At this time, the U.S. Nuclear Regulatory Commission (NRC) staff does not recommend revising the formula (Table of Minimum Amounts), as found in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.75(c)(1), or the adjustment factors at 10 CFR 50.75(c)(2). The foundation for the staff's conclusion was through reviewing the formula in light of more recent information and decommissioning experiences. Staff contracted with Pacific Northwest National Laboratory (PNNL) to evaluate new information and the adequacy of the minimum decommissioning funding requirement, held a public meeting, and reassessed the formula in light of the PNNL study and stakeholder comments. This paper does not address any new commitments or resource implications.

BACKGROUND:

On February 6, 2006, the Office of the Inspector General (OIG) issued OIG 06 A 07, "Follow up Audit of the Nuclear Regulatory Commission's Decommissioning Fund Program." In its

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consolidated list of recommendations, OIG suggested that the NRC staff, "Update NRC's decommissioning formula considering the relationship between formula based and site-specific estimates." On March 23, 2006, the NRC staff addressed recommendations in OIG-06-A-07 through the issuance of SECY-06-0065. On May 17, 2006, the Commission directed the staff to assess the adequacy of the 10 CFR 50.75(c), "Table of Minimum Amounts," which also is referred to as the minimum decommissioning funding formula or the formula. The formula defines the minimum acceptable dollar amount that a light-water power reactor must certify will be available for radiological decommissioning and decontamination of its reactor.

#### *Decommissioning Funding Assurance*

Each commercial power reactor licensee is required, pursuant to 10 CFR 50.75, to apply a decommissioning funding assurance process to demonstrate that the bulk of needed financial resources will be available for decommissioning activities.

The formula establishes a minimum amount, or reference level, for which each commercial nuclear power reactor licensee must accumulate committed financial resources. By periodically recertifying to account for changing costs, and reporting that it is accumulating adequate financial resources during the operating life of the license, a licensee provides reasonable assurance for decommissioning funding. The formula addresses the minimum decommissioning funding assurance requirements for light-water reactors, and it reflects differences in anticipated decommissioning costs between pressurized-water reactors (PWR) and boiling-water reactors (BWR) based on their thermal capacity. Title 10 CFR 50.2, "Definitions," defines decommissioning as the removal of a facility or site safely from service and reduction of 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. The formula does not include the costs of spent fuel management, independent spent fuel storage installation decommissioning, site restoration, and other costs not related to radiological decontamination.

As stated in the Statement of Considerations for 10 CFR 50.75:

"The amount listed as the prescribed amount (formula) does not represent the actual cost of decommissioning for specific reactors but rather is a reference level established to assure that licensees demonstrate adequate financial responsibility that the bulk of the funds necessary for a safe decommissioning are being considered and planned for early in facility life, thus providing adequate assurance at that time that the facility would not become a risk to public health and safety when it is decommissioned." (53 FR 24030, June 27, 1988)

The formula uses a base of 1986 dollars (10 CFR 50.75(c)(1)), which a licensee must recalculate annually (and report biennially to the NRC) to current dollars by use of an

adjustment factor. The adjustment factor has a fixed weighted index of 0.65 for labor, 0.13 for energy, and 0.22 for low-level waste burial costs as stated in 10 CFR 50.75(c)(2). The adjustment factor accounts for inflation changes in labor costs, energy costs, and low-level waste burial costs. The adjustment factors are made publically available, for use by licensees, in biennial revisions of NUREG-1307, "Report on Waste Burial Charges." (Each successive revision of NUREG-1307 captures the inflation from the previous two years). The result of this calculation raises the base 1986 dollars to a current year minimum amount of financial resources that the licensee must certify and hold in an approved financial instrument, which is typically an external trust. The total financial resources held in approved financial instruments, which includes expected earnings and rate collections, must be equal to or greater than the amount calculated by application of the formula.

At or about five years before permanent cessation of operations, (or within two years after an announced premature shutdown) a licensee must provide a site-specific decommissioning cost estimate (SSCE), which may be greater, but not less than, the formula amount. At this time, the SSCE becomes the minimum acceptable amount to which the licensee must certify. The intent of the SSCE is to provide an up-to-date assessment and a more accurate radiological decommissioning cost figure. The total financial resources held in approved financial instruments, which includes expected earnings and rate collections, must be equal to or greater than the SSCE amount over the remaining operating life of the reactor.

#### DISCUSSION:

The staff reevaluated the basis for the formula in light of more recent information and decommissioning experiences. Staff contracted with PNNL to evaluate new information and the adequacy of the minimum decommissioning funding requirement, held a public meeting, and reassessed the formula in light of the PNNL study and stakeholder comments.

Licensees are under no regulatory obligation to disclose final decommissioning costs to the NRC after the operating license is terminated. This makes it challenging to establish an accurate decommissioning funding estimate. Furthermore, when overall decommissioning costs are available it is often difficult, if not impossible to distinguish those costs that specifically address the NRC's radiological decommissioning requirements from the total cost of decommissioning, which includes all other non-radiological decommissioning activities. One lesson learned from past experience is that the decommissioning of any one reactor will likely present its own unique challenges and cost drivers. Unique site specific cost drivers are difficult to incorporate into a generic formula used to demonstrate reasonable assurance of funds for decommissioning but may be used to determine a conservative or bounding amount. Nonetheless, each licensee should identify and address such costs upon development and submission of the site-specific decommissioning cost estimate, as required, about five years before permanent cessation of reactor operations.

*PNNL Draft Study:*

In 2009, the NRC contracted for a study by PNNL to reevaluate the adequacy of the minimum decommissioning fund requirement specified by the formula. As the original formula was based on two studies performed by PNNL in 1978 and 1980, PNNL sought to evaluate additional nuclear power plant decommissioning experience and changes in decommissioning technology and practices since that time.

PNNL's approach was to compare differences between the decommissioning cost estimates from the original studies with actual costs from four completed decommissioning projects, site specific decommissioning cost estimates prepared by licensees and other decommissioning-related information. PNNL evaluated decommissioning technology and practices in use today, reviewed 27 site-specific decommissioning cost estimates submitted by licensees to the NRC, considered actual costs, lessons learned and experience gained from the decommissioning of several large nuclear power plants (Trojan, Rancho Seco, Maine Yankee, and Haddam Neck), and evaluated current low-level radioactive waste (LLW) handling practices and disposal costs. Since Trojan, Rancho Seco, Maine Yankee, and Haddam Neck were decommissioned by electric utility licensees with access to ratepayer funds, the PNNL Draft Study contains no data on large merchant power plants as none have been decommissioned.

PNNL's study and reevaluation of the adequacy of the formula, by necessity, incorporated various estimates, assumptions, and hypothetical scenarios about reactor decommissioning. This was unavoidable as actual and final data regarding past power plant decommissioning experience applicable to today's reactor fleet is limited, and future reactor decommissioning projects are often decades away. In addition, no large BWRs have yet completed decommissioning and, therefore, no such data was available to PNNL in its analysis. Moreover, several of the past reactor decommissioning projects evaluated by PNNL addressed unique and sometimes costly decommissioning issues that significantly contributed to final costs, such as soil remediation at Haddam Neck. Similarly low LLW disposal costs and one-piece removal and disposal of the reactor pressure vessel and most reactor internal components appeared to be the significant cost drivers for the low cost of radiological decommissioning of the Trojan facility.

PNNL's study is documented in draft report, "Assessment of the Adequacy of the 10 CFR 50.75(c) Minimum Decommissioning Fund Formula," (PNNL Draft Study), dated November 2011, Agencywide Documents Access and Management System (ADAMS) Accession No. ML13063A190, and is publicly available. In its conclusion, PNNL proposed a revised formula, including new weighting of the adjustment factors and a new base year (2010). The primary function of the PNNL proposed formula was for comparison against the current formula.

*Public Meeting:*

On February 27, 2013, the NRC held a (Category 2) public meeting (meeting announcement: ADAMS Accession No. ML13014A378) to discuss and solicit input from the public, industry, and other interested groups on the potential adjustments to the Table of Minimum Amounts in 10 CFR 50.75(c)(1) and (2) for commercial nuclear reactors. The meeting was widely attended and included representatives of the Nuclear Energy Institute, Entergy, Morgan Lewis, the State of New York Attorney General's Office, and others (meeting summary can be found in ADAMS Accession No. ML13063A174).

During the meeting, participants indicated that the Table of Minimum Amounts could successfully accomplish its purpose, which is to establish a common minimum standard measurement to which each licensee must accumulate committed financial resources during the life of the operating license. No participant advocated changing the Table of Minimum Amounts.

Subsequently, on April 26, 2013, Mr. Ralph Anderson, Senior Director, Radiation Safety and Environmental Protection at the Nuclear Energy Institute, a participant at the public meeting, submitted correspondence (ADAMS Accession No. ML13140A234) that stated:

“In summary, we (NEI) do not believe that any adjustment to the formula used for decommissioning funding requirements is necessary at this time. This conclusion is based on our review and understanding of previous NRC staff views on the decommissioning funding process, current industry funding practices and experience, and actual industry decommissioning and license termination results.

In April 2012, the U.S. General Accounting Office (GAO) published Report GAO-12-258, “NRC’s Oversight of Nuclear Power Reactors’ Decommissioning Funds Could Be Further Strengthened.” The report does not specifically recommend that the formula used for decommissioning funding requirements be changed.”

*Staff Analysis:*

The NRC staff considered the results of the PNNL study in its reevaluation of the formula used to establish a minimum amount, or reference level, for which each commercial nuclear power reactor licensee must accumulate committed financial resources for radiological decommissioning.

The NRC staff independently calculated decommissioning funding amounts as prescribed by the current formula for 104 power reactor licenses (reactor count prior to May 7, 2013), based on data from the 2011 biennial decommissioning funding status (DFS) reports submitted by

each licensee. The NRC staff also calculated the decommissioning funding amount using the proposed Table of Minimum Amounts from the PNNL study for all 104 power reactor licenses. Staff then compared the results of the two sets of calculations and, on average, the proposed formula yielded an amount that was 6.8 percent higher for PWRs and 15.4 percent lower for BWRs.

The NRC staff considered the differences reflected in the comparison of the results and concluded that the current formula provides a reasonable minimum financial value, or reference level, for reasonable assurance of decommissioning funding. This is acceptable because it is a reference level established to assure that licensees demonstrate adequate financial responsibility that the bulk of the funds necessary for safe decommissioning are being considered and planned for early in facility life.

Furthermore, under 10 CFR 50.75(f)(1), staff's evaluation of decommissioning funding assurance includes review of DFS reports every two years. This review of decommissioning funding assurance by the staff provides a periodic opportunity for review of current industry and market financial considerations, providing an opportunity to take additional steps if necessary as stated in 10 CFR 50.75(e)(2):

“The NRC reserves the right to take the following steps in order to ensure a licensee's adequate accumulation of decommissioning funds: review, as needed, the rate of accumulation of decommissioning funds; and, either independently or in cooperation with the FERC and the licensee's State PUC, take additional actions as appropriate on a case-by-case basis, including modification of a licensee's schedule for the accumulation of decommissioning funds.”<sup>1</sup>

The staff's last completed review of the DFS reports has found that licensees are currently providing reasonable assurance of decommissioning funding (See SECY-11-0149, “Summary Findings Resulting from the Staff Review of the 2010 Decommissioning Funding Status Reports for Operating Power Reactor Licensees”).

GAO's recent report, GAO-12-258, “NRC's Oversight of Nuclear Power Reactors' Decommissioning Funds Could Be Further Strengthened,” noted that the minimum formula is generally less than the SSCE. GAO recommended that the NRC define what is meant when it says the minimum formula represents the bulk of the funds needed for decommissioning. Applying the results of the PNNL study, the minimum formula represents the low end of the range of decommissioning costs. This is acceptable because significantly raising the minimum could result in requiring some licensees to provide financial assurance greater than the funds

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<sup>1</sup> This section does not permit the NRC to require a licensee to accumulate more funds than called for by the regulation.

needed to decommission. However, the minimum formula does not relieve the licensee from providing assurance that funds will be available when needed for the full cost of radiological decommissioning. The current regulatory system provides for the cases where the cost estimate exceeds the minimum formula by requiring a SSCE five years before permanent shutdown, or within two years following a premature shutdown. The SSCE then becomes the amount of financial assurance the licensee must certify and provide. The regulatory system has been successful in the past, since no reactor has failed to perform its decommissioning obligation due to lack of funds.

At a public meeting held March 2, 2011, the NRC staff informed stakeholders that it was concerned that the minimum formula did not include property taxes or remediating soil contamination as part of the cost of decommissioning (ADAMS Accession No. ML110690199). However, the staff has concluded that these costs are not needed in the formula for the following reasons. These costs are highly site-specific, and difficult to incorporate into the minimum formula. With respect to property taxes, the amount of tax is not a significant cost driver for immediate decommissioning. Property taxes can be significant if decommissioning is carried out over many years, as the SAFSTOR option provides. However, when a licensee chooses the SAFSTOR option, it must also account for annual costs of safe storage until the license is terminated. These costs as well as property taxes must be included in the SSCE. With respect to soil contamination, the Decommissioning Planning Rule, which became effective in December 2012, requires the licensee to monitor subsurface contamination and keep records of the contamination for decommissioning planning. The remediation costs must be included in the SSCE.

#### CONCLUSION:

At this time, NRC staff does not recommend revising the Table of Minimum Amounts, as found in 10 CFR 50.75(c)(1), or the adjustment factors at 10 CFR 50.75(c)(2). The formula in 10 CFR 50.75(c) successfully establishes 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 and described above. Licensees continue to have the flexibility to use a SSCE to determine if larger amounts of funding are needed for radiological decommissioning. Licensees may voluntarily fund the decommissioning trust to any level higher than the minimum identified by use of the formula. A final step requires that at five years before permanent shutdown, or within two years following a premature shutdown, licensees must certify funding to the five year SSCE. These requirements along with the requirements for reporting decommissioning funding to the NRC provide a robust program to assure that licensees will have adequate funds available for decommissioning. The regulations have been amended when needed to recognize changes in the industry and lessons learned. Historically this process has been successful as sufficient funding was available to complete decommissioning of nuclear power plants to NRC regulations, as necessary.

The NRC staff recognizes that future changes to the formula may be needed when decommissioning cost data for small modular reactors is available (Reference SECY-11-0181, "Decommissioning Funding Assurance for Small Modular Nuclear Reactors"). The Table of Minimum Amounts may need to be adjusted to reflect the special nature of small modular reactors through rulemaking. The staff will continue to evaluate future industry changes and take actions to propose revisions to the decommissioning funding regulations, as necessary.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection. The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objection. The Office of Federal and State Materials and Environmental Management Programs, the Office of Nuclear Material Safety and Safeguards, and the Office of New Reactors have reviewed this paper and have no objections.

***/RA/ (Jennifer L. Uhle for)***

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