



POLICY ISSUE

(Notation Vote)

March 5, 2021

SECY-21-0026

FOR: The Commissioners

FROM: Margaret M. Doane
Executive Director for Operations

SUBJECT: DISCONTINUATION OF RULEMAKING—SPENT FUEL
REPROCESSING

PURPOSE:

The purpose of this paper is to request Commission approval to discontinue the Spent Fuel Reprocessing rulemaking activity that was directed by Staff Requirements Memorandum (SRM) SECY-13-0093, "Staff Requirements—SECY-13-0093—Reprocessing Regulatory Framework—Status and Next Steps," dated November 4, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13308A403). The U.S. Nuclear Regulatory Commission (NRC) staff has determined that a continued rulemaking effort is not currently justified, as there is limited interest expressed or expected from potential applicants for reprocessing facilities, including advanced reactor designers, in the near-term use of reprocessed spent fuel. Therefore, while a rule could provide additional clarity for potential applicants, it is not currently cost-justified. This paper does not contain any new commitments or resource implications.

BACKGROUND:

In SECY-13-0093, "Reprocessing Regulatory Framework—Status and Next Steps," dated August 30, 2013 (ADAMS Accession No. ML13178A233), the staff provided options for the development of a regulatory framework for licensing and regulating a reprocessing

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facility. In SRM-SECY-13-0093, the Commission approved the staff's recommendation to develop a reprocessing-specific rule in a new part of the Commission's regulations, referred to notionally as "Title 10 of the *Code of Federal Regulations* (10 CFR), Part 7X," but directed that the staff's "continued development of the regulatory framework be limited in scope—for the time being—to the resolution of Gap 5, 'Safety and Risk Assessment Methodologies and Considerations for a Reprocessing Facility.'" Gap 5 was focused on the development of analytical methods for the quantitative assessment of risks associated with reprocessing facility accidents to inform the basis for the development of regulatory requirements and regulatory guidance. The SRM also directed the staff to provide a notation vote paper presenting the results of this limited-scope effort, as well as recommendations on next steps. The paper would give the staff's most up-to-date assessment of the prospects for the construction of recycling facilities in the United States, the status of U.S. Department of Energy (DOE) activities in this area, and the staff's recommendation for the next phase of work.

As discussed in SECY-13-0093, industry interest was the primary impetus for the NRC to update the regulatory framework for reprocessing light-water reactor spent fuel. Based on the level of industry interest and the Commission's direction, from 2013 to 2016 the staff focused its efforts on assessing the quantitative risk associated with reprocessing facility accidents (i.e., Gap 5). In 2016, the staff found that industry interest in constructing and operating a commercial light-water reactor spent fuel reprocessing facility had declined. As a result, in 2016, the staff temporarily stopped work on the spent fuel reprocessing regulatory framework because of other higher priorities related to spent fuel storage and transportation, as well as budgetary constraints. During the staff's more recent outreach efforts described below, advanced reactor applicants indicated that they have limited near-term interest (within the next decade or two) in the use of reprocessed spent fuel.

In SECY-15-0129, "Commission Involvement in Early Stages of Rulemaking," dated October 19, 2015 (ADAMS Accession No. ML15267A759 (package)), the staff recommended an approach to discontinue rulemakings previously authorized by the Commission. The Commission approved the staff's recommendation in SRM-SECY-15-0129, dated February 3, 2016 (ADAMS Accession No. ML16034A441), and directed that the staff explore ways to minimize the resources necessary to discontinue a rulemaking. Consistent with SECY-15-0129 and the Commission's direction, the staff reached out to interested stakeholders and conducted an evaluation to determine if continuation of the reprocessing rulemaking activity was cost-justified.

DISCUSSION:

To obtain stakeholder input in evaluating discontinuation of this rulemaking, the NRC held a public meeting on March 4, 2020, to determine the degree of stakeholder interest in constructing, operating, and licensing a spent fuel reprocessing facility (ADAMS Accession No. ML20077K144 (package)). Participating stakeholders included the Nuclear Energy Institute (NEI), the DOE, the Union of Concerned Scientists (UCS), industry representatives, environmental groups, and private citizens. NEI and industry representatives voiced their support for continuing the rulemaking primarily on the basis of a need for a clear and stable regulatory framework for reprocessing and to support advanced reactor licensing. However, no industry stakeholders indicated that they plan to submit an application to the NRC for a reprocessing facility in the foreseeable future. Other stakeholders, such as UCS and members of the public, indicated they do not support the continuation of the rulemaking because of proliferation and other concerns.

In May 2020, after the public meeting, NEI and American Nuclear Society (ANS) sent letters to the NRC with further feedback on the need for rulemaking (ADAMS Accession Nos. ML20154K554 and ML20154K530). NEI stated that developers with advanced reactor designs that may eventually source their fuel from the spent fuel of other reactors are generally not planning to do so in the near future. NEI encouraged the NRC to assess the technologies for advanced reactors before making any decisions on the reprocessing rulemaking. It also suggested that the NRC should not charge existing facilities with fees for work on a reprocessing rule. ANS encouraged the NRC to continue with the rulemaking, which is consistent with the ANS policy position that recycling (i.e., the combination of reprocessing and fuel fabrication) may significantly enhance uranium resource utilization by reclaiming a larger fraction of the unused energy in used fuel, which could in turn minimize the volume and toxicity of radioactive waste requiring disposal in a geologic repository. ANS also stated that the lack of an efficient, technically robust, and technology inclusive regulatory foundation for reprocessing and recycling is a barrier to innovation in advanced reactor designs.

Subsequently, the NRC engaged other organizations and vendors in the advanced reactor community to assess their interest in and specific needs for reprocessing, such as the use of fuel recovered from the existing spent fuel feedstock. Based on these interactions, the NRC staff concluded that in addition to using fresh fuel obtained from enrichment and fabrication, some advanced reactor designs have the capability to eventually source their fuel from the spent fuel of other reactors. However, as discussed in Enclosure 1 (proprietary), vendors expressed limited interest in pursuing reprocessing activities in the near future (within 10 to 20 years).

Separately, during periodic NRC public meetings with advanced reactor stakeholders to discuss non-light-water reactor topics of interest, NEI informed the NRC that it had formed a working group composed of advanced reactor developers and nuclear fuel manufacturers to evaluate and monitor future industry needs in the area of reprocessing. NEI indicated that this group has not identified any near-term plans for developing reprocessing capabilities for advanced reactor designs and that it would inform the NRC of any such plans identified in the future, including any proposed changes to NRC's regulatory framework.

In addition, the NRC has ongoing technical information exchanges with staff from the DOE's Office of Nuclear Energy (DOE-NE) under a memorandum of understanding on fuel cycle research and development. The NRC specifically consulted DOE-NE about developments in reprocessing efforts and technologies, particularly in reprocessing of spent fuel for advanced reactors. Based on these interactions, the staff concluded that current DOE efforts in the area of reprocessing are aimed at providing a limited near-term supply of high-assay low-enriched uranium (HALEU) for initial advanced reactor designs. In particular, DOE is working on reprocessing highly enriched uranium from spent fuel from the Experimental Breeder Reactor-II and down-blending it to HALEU. The DOE's current objective is to deliver approximately five metric tons of HALEU by 2023. These DOE reprocessing initiatives do not require NRC licensing. The NRC is supporting other commercial initiatives involving HALEU fuel. However, the staff is not aware of any other DOE initiatives to reprocess spent fuel (i.e., light-water reactor fuel) or potential commercial efforts to reprocess spent HALEU fuel for reuse in advanced reactors. The staff will continue to interact with DOE to assess any developments related to reprocessing.

Internationally, U.S. cooperative activities regarding reprocessing have been limited since initiatives for the Global Nuclear Energy Partnership waned after 2008. Although a few other countries are capable of or interested in reprocessing, the staff is not aware of any planned or

ongoing international collaboration activities that would affect the near-term development of reprocessing technologies in the United States. Nonetheless, the staff will continue to monitor activities related to reprocessing by other countries and organizations.

The staff notes that the regulatory infrastructure discussed in SECY-13-0093 may not be optimal to address the various and evolving technologies to support current advanced reactor designs. Consistent with the NRC's vision and strategy for readiness for non-light-water reactor designs (ADAMS Accession No. ML16356A670), the staff will continue its engagement with any potential applicants and with the advanced reactor community to assure readiness to effectively and efficiently license these technologies, including any rulemaking needs related to reprocessing.

In the event that the NRC receives an application for a commercial reprocessing facility prior to a rulemaking, the NRC would likely use the existing regulatory framework under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities" for licensing activities, since a reprocessing facility is a type of production facility as defined in 10 CFR 50.2, "Definitions." The staff's view is that licensing a reprocessing facility can be adequately accomplished under this existing framework. However, the staff anticipates there would be a need for exemptions from certain 10 CFR Part 50 requirements. The staff plans to leverage knowledge from the gap analysis enclosed in SECY-13-0093, in considering any exemptions, and if needed, will use the gap analysis to inform any potential future rulemaking efforts.

The staff estimates that it would cost \$2.5 million to complete a regulatory basis, develop and issue guidance, and develop a proposed and final rule. There are no resources specifically budgeted for this rulemaking. In addition, this estimate is limited to a Gap 5 only rulemaking and would not cover resources necessary to address the other gaps in the NRC's regulatory infrastructure that were identified in SECY-13-0093. Gap 5 was focused on the development of safety requirements and regulatory guidance for identifying and assessing risks associated with reprocessing facility accidents. Other gaps identified in the enclosure to SECY-13-0093 that would not be addressed in this rulemaking include gaps in regulations that would ensure the safe operations of the facility, such as technical specifications and general design criteria; licensing process; and waste, environmental, and operational considerations.

Given the estimated costs and the limited interest, expressed or expected, from potential applicants and advanced reactor designers in building facilities involving reprocessing technologies in the near-term, the staff concludes that, while a rule could provide additional clarity for potential applicants, a continued rulemaking effort is not currently justified. Should the Commission approve the discontinuation of the rulemaking, the staff will continue to interact with potential applicants and industry to assess the need for regulatory activity in support of reprocessing. If, as a result of these interactions, the staff or industry identifies specific needs for reprocessing, the staff will reengage the Commission, as appropriate. In the event that the NRC receives an application for a facility that reprocesses fuel, the staff can adequately address any near-term licensing needs through the existing regulatory framework.

RECOMMENDATIONS:

The staff recommends that the Commission approve the following actions:

- (1) Discontinue the Spent Fuel Reprocessing rulemaking.
- (2) Publish the *Federal Register* notice in Enclosure 2 informing the public that the NRC has discontinued the rulemaking.

If the Commission approves the staff's recommendation to discontinue the Spent Fuel Reprocessing rulemaking, the staff will inform the appropriate Congressional committees of this action and ensure orderly closure of the rulemaking activity in the NRC's portion of the Unified Agenda of Regulatory and Deregulatory Actions, including capturing insights from the rulemaking efforts to date.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.

The Office of the Chief Financial Officer reviewed this paper and has no objections.

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Date: 2021.03.05 15:44:34 -05'00'
Margaret M. Doane
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Enclosures:

1. Limited Interest in Fuel Reprocessing
2. *Federal Register* notice

SUBJECT: DISCONTINUATION OF RULEMAKING—SPENT FUEL REPROCESSING
 DATED: March 5, 2021

ADAMS Accession Nos.: ML20301A387 (Pkg) WITS: 201300144

***Via E-Mail**

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