

## **POLICY ISSUE INFORMATION**

May 31, 2012

SECY-12-0078

FOR: The Commissioners

FROM: Catherine Haney, Director  
Office of Nuclear Material Safety  
and Safeguards

SUBJECT: ANNUAL STATUS REPORT: ACTIVITIES RELATED TO  
EXTENDED STORAGE AND TRANSPORTATION AND THE  
LONG-TERM WASTE CONFIDENCE UPDATE

PURPOSE:

This paper provides the Commission with a status report on the staff's activities related to the extended storage and subsequent transportation of spent nuclear fuel (SNF) and the long-term Waste Confidence (WC) update. This paper responds to direction for an annual status report in staff requirements memorandum (SRM) COMSECY-10-0007, "Project Plan for Regulatory Program Review to Support Extended Storage and Transportation of Spent Nuclear Fuel," dated December 6, 2010 (ML103400287). This paper does not address any new commitments.

SUMMARY:

The staff has established an Extended Storage and Transportation (EST) Regulatory Program to coordinate its EST activities with a potential update of the WC decision and rule, including development of a draft environmental impact statement (EIS). In accordance with Commission direction and as resources allow, the staff plans to complete the technical analyses to address any potential regulatory changes needed for EST in 2018 and complete the long-term WC update in 2019. In parallel, the staff is also implementing improvements in near-term licensing

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and inspection activities in the spent fuel storage and transportation program, which were originally defined in COMSECY-10-0007 and further described in SECY-11-0029. The staff has not identified policy issues for Commission consideration beyond those previously identified in COMSECY-10-0007.

#### BACKGROUND:

On June 15, 2010, the staff provided a detailed project plan in COMSECY-10-0007 (ML101390413), with an attachment that identified research needs and potential enhancements to the EST regulatory basis (ML101390216). The Commission approved this plan, in part, in SRM-COMSECY-10-0007. Separately, in SRM-SECY-09-0090, "Final Update of the Commission's Waste Confidence Decision" (September 15, 2010; ML102580229), the Commission directed the staff to update Title 10 of the *Code of Federal Regulations* (10 CFR) 51.23, "Temporary Storage of Spent Fuel after Cessation of Reactor Operation - Generic Determination of No Significant Environmental Impact," and revise Findings 2 and 4 of the WC decision. The Commission also directed the staff to develop a plan for a long-term WC update and stated that the plans for this longer-term update should be integrated and realigned with the staff's efforts to examine the EST of spent nuclear fuel resulting from COMSECY-10-0007.

The staff responded to these two SRMs in SECY-11-0029, "Plan for the Long-Term Update to the Waste Confidence Rule and Integration with the Extended Storage and Transportation Initiative" (February 28, 2011; ML110260244), which described the staff's plans to develop the long-term WC update and to ensure that the update is informed by and integrated with the U.S. Nuclear Regulatory Commission's (NRC's) parallel technical activities on EST.

#### DISCUSSION:

##### EST Regulatory Program

The EST Regulatory Program was established to coordinate two major activities related to EST and WC, in accordance with SRM-SECY-09-0090 and SRM-COMSECY-10-0007. The staff has named these activities the EST Safety and Security Project and the Long-Term WC Update Project, respectively. The two projects have different goals but share a common focus: the storage and subsequent transportation of SNF over extended periods. The EST Safety and Security Project addresses the technical information for EST, with the goal of ensuring the regulatory framework for these activities is appropriate. The Long-Term WC Update Project addresses the potential environmental impacts of extended storage over a period beyond that defined in the current WC rule, with the goal of a possible extension of the WC rule to a longer period. Enclosure 1 illustrates the structure of the overall program and provides general timelines for the EST and WC projects.

The NRC's regulatory framework for SNF storage and subsequent transportation is fundamental to both projects. Potential revisions to this framework to accommodate extended storage depend in part on the development of new technical information. The NRC staff's planned research focuses on evaluating the adequacy of the current regulatory framework and providing the technical information needed to support potential regulatory changes. Both industry and the U.S. Department of Energy (DOE) play important roles in developing the needed technical information. DOE has issued a technical gap analysis for extended storage and is developing

plans for long-term research activities for extended storage. The industry has a range of technical information needs that is commensurate with its responsibilities, as licensees and certificate holders, to comply with NRC regulations and to manage SNF safely and securely over potential extended periods. As described in the EST Safety and Security Project section of this paper, the staff has several mechanisms available to interact with DOE and other stakeholders to obtain information needed to address potential regulatory issues for EST. In addition to engaging those outside groups who are working to resolve technical information needs, staff is reaching out to other external stakeholders, through public meetings and webinars, to inform and seek input from the public on staff activities.

As part of the EST Regulatory Program, the staff is coordinating internally with related activities in NRC Program Offices, through an interoffice working group. For example, the staff is coordinating activities under the EST Safety and Security Project with reactor regulatory activities associated with life extension of spent fuel pools and potential licensing of advanced reactors. The working group also supports the Long-Term WC Update Project by providing input on specific technical or environmental issues, as needed.

Further internal coordination for the EST Regulatory Program includes a current initiative in which the staff is identifying and implementing near-term licensing and inspection improvements<sup>1</sup> within the licensing program for current SNF storage and transportation. This coordination ensures that proposed regulatory enhancements to address current licensing challenges are also considered as part of the EST regulatory framework.

In accordance with Commission direction in SRM-COMSECY-10-0007, which identified those areas to be specifically addressed, work related to certain aspects of the EST Regulatory Program is being delayed to allow for the completion of the higher-priority activities described in this paper. Specifically, the staff will defer consideration of the potential effects of extended storage on physical security requirements until at least 2015, after completion of the current security rulemaking for storage (independent spent fuel storage installation security requirements for radiological sabotage in 10 CFR Part 73, “Physical Protection of Plants and Materials”) is completed. The staff plans to address four activities identified in the project plan enclosed in COMSECY-10-0007 in the 2014–2018 time frame: reviewing financial assurance for extended storage, promoting development of developing domestic codes and standards, and identifying state-of-the-art technology incentives and comprehensive risk-informed enhancements to 10 CFR Part 72, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste.” As discussed in Enclosure 2 of SECY-11-0029, the staff will be using limited risk assessments in the EST and WC analyses.

### Extended Storage and Transportation Safety and Security Project

This Project is principally focused on identifying and addressing the technical and regulatory considerations for ensuring effective regulation of SNF storage and subsequent transportation over extended periods. At present, the staff believes that the current regulatory framework being used to renew current licenses (i.e., first renewal) provides a basic framework to regulate management of SNF and high-level waste for multiple renewal periods. The staff is examining technical areas associated with multiple renewals of fixed-term, dry storage licenses and certificates to address age-related degradation of dry cask storage systems, structures, and

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<sup>1</sup> These near-term licensing and inspection process improvements for the transportation and storage programs under 10 CFR Parts 71 and 72, respectively, are described in COMSECY 10-0007 and SECY-11-0029.

components. As stated in the previous section, staff will begin work on security issues after the current security rulemaking in 10 CFR Part 73 is completed.

On May 3, 2012, the NRC staff issued for public comment a draft assessment of technical information needs affecting the age-related degradation of dry cask storage system components for commercial SNF that may require additional research (“Identification and Prioritization of Technical Information Needs Affecting Potential Regulation of Extended Storage and Transportation of Spent Nuclear Fuel”; ML120580143). This report synthesizes information from existing studies and provides the staff’s assessment of how age-related degradation phenomena could affect performance and staff evaluation of regulatory compliance of future EST activities. The staff will brief the Advisory Committee on Reactor Safeguards on the content of the report later this year. In the draft report, the staff identifies for further investigation a number of high priority areas and their potential impact on the dry cask system’s ability to perform its safety functions and satisfy NRC’s regulatory requirements, such as the design criteria for SNF storage in 10 CFR Part 72, Subpart F. Priority areas for further investigation include the potential for stress corrosion cracking of stainless steel canisters in specific environments, the impact of cladding stress from fuel swelling or pressurization, the effect of degradation of cask bolts on the inert containment environment, the effects of residual moisture after drying, and the need to improve thermal calculations and methods for monitoring and inspecting in-service dry storage systems. The staff has begun technical investigations in some of these areas and is developing plans to address the remaining information needs, including engaging DOE, the industry, and other researchers conducting technical work in these areas.

The staff has several ways to engage external stakeholders involved directly in technical work on EST issues. One way is through the Extended Storage Collaboration Program (ESCP), organized by the Electric Power Research Institute (EPRI). ESCP includes participants from EPRI, DOE and its laboratories, the Nuclear Waste Technical Review Board, the Nuclear Energy Institute, other industry representatives (both licensees and dry storage cask vendors), and representatives from the International Atomic Energy Agency (IAEA) and many countries having nuclear power programs. ESCP is coordinating specific work on several materials degradation topics and evaluating options for a possible cask demonstration project for extended dry storage of SNF. Outside of the ESCP framework, the NRC staff has engaged DOE directly on technical issues and has ongoing dialogues with governmental organizations in several countries, including Korea, Japan, Germany, and the United Kingdom, on technical areas of mutual interest. The NRC is also participating in two related consultancies and one cooperative research project of the IAEA, and in a related Nuclear Energy Agency (NEA) sponsored project. These IAEA and NEA projects are investigating technical and regulatory areas that relate to EST, including the use of dual-purpose casks and the identification of related technical data needs. Participants include countries with different levels of involvement in the nuclear fuel cycle.

In the coming year, the staff will continue to focus on resolving technical information needs and identifying potential regulatory issues for EST. The primary near-term tasks will include incorporating public comments on the technical information needs assessment report and completing an initial identification of potential regulatory and policy issues. As discussed in Enclosure 1, these tasks fall into the first two phases of a three-phase plan for the EST Safety and Security Project. These first two phases concern identification and resolution of technical and regulatory issues. The third phase involves implementation of any changes to regulations and guidance.

### Long-Term Waste Confidence Update Project

This Project focuses on the development of an EIS to inform a potential change to the WC decision and rule. The NRC staff explained its current plan for the EIS in a draft report published for public comment in December 2011, entitled “Background and Preliminary Assumptions for an Environmental Impact Statement – Long-Term Waste Confidence Update” (ML11340A141). The comment period for this report closed on March 19, 2012. The staff is working to publish a final report by the end of fiscal year (FY) 2012 that will provide responses to the comments from individuals, public interest groups, industry groups, and government bodies. Work planned for FY 2013 is described later in this section.

The proposed WC EIS differs from other NRC EISs and comparable EISs prepared by other agencies. These differences, which are described in Enclosure 1, contribute to the challenge of communicating to stakeholders about the complexity of the possible long-term update. As part of its stakeholder outreach efforts, the staff conducted three public meetings in September and October 2011, and has held two webinars to discuss staff assumptions and activities associated with the planned EIS. The staff also presented information at several national and international conferences, developed a public involvement website (<http://www.nrc.gov/waste/spent-fuel-storage/public-involvement.html>), prepared electronic mailing lists to alert stakeholders of ongoing activities and solicit feedback, and contacted more than 50 federally-recognized Native American tribes.

In FY 2013, the staff will continue its preliminary investigations to support further refinement of the EIS assumptions and scenarios and will prepare for the formal scoping process under the National Environmental Policy Act (NEPA). The staff will prepare documents for public comment that explain the proposed scope and analytical methods for the EIS and explain how the EIS could support a potential change to the WC decision and rule. The staff plans to initiate the formal NEPA process no sooner than late 2013 with a notice in the *Federal Register*. Following the *Federal Register* notice, the staff plans to hold several public meetings to obtain further input on the EIS scope and its proposed scenarios and to develop and publish a report of the scoping input, which may include revised scenarios. Although a rulemaking may be developed as part of the long-term WC update, the staff will not begin rulemaking activities until the draft EIS is well under way. Enclosure 1 presents the general schedule for this Project.

### Previously-Identified Potential Policy Issues

The staff identified four potential policy issues in Enclosure 1, Appendix A, of COMSECY-10-0007. These issues are related to both the EST Regulatory Program and initiatives for near-term improvements to the current regulatory framework. These issues are not yet ready for Commission consideration. The staff is now working on three of these issues and will be addressing the remaining issue (financial assurance) by 2018. The three issues currently under consideration are (in order of priority): 1) requirements for cladding integrity and ready-retrieval of fuel during storage and subsequent transportation; 2) the compatibility of dual-purpose certification requirements; and 3) streamlining current cask rulemaking certification processes.

To develop these potential policy issues, the staff is examining current practices and assumptions in response to the changing national policy and licensees' current spent fuel management needs. For example, the current regulatory frameworks for SNF storage (10 CFR Part 72) and transportation (10 CFR Part 71, “Packaging and Transportation of Radioactive Material”) were based in part on assumptions that SNF transportation would occur after a

relatively short storage period in a limited number of cask designs. Also, some dual-purpose cask technologies, currently licensed for storage, have been loaded and sealed without companion transportation approvals or definitive shipment timeframes. In addition, potential technical needs to repackage SNF during extended storage timeframes could represent a significant impact on industry (e.g., worker exposures, financial considerations) and the associated NRC staff review effort.

The staff will further develop these potential policy issues as part of its licensing process improvement activities, conducting workshops and requesting stakeholder feedback to inform the development of each potential issue. After receiving stakeholder feedback, the staff will present any policy issues to the Commission, including recommendations for rulemaking and guidance development.

The staff will develop the potential policy issue concerning financial assurance in conjunction with the EST Safety and Security Project, after it has made progress on the three higher-priority issues. In accordance with Commission direction in SRM-COMSECY-10-0007, the staff will inform the Commission before beginning work on financial assurance. The staff will engage the Commission on any other policy issues that may arise through its work on the EST Regulatory Program.

#### RESOURCES:

Resources proposed to complete the EST safety and security reviews in 2018 and the long-term WC update in 2019 are discussed in non-public Enclosure 2. All resources for the EST Regulatory Program are accounted for in the Spent Fuel Storage and Transportation Business Line.

#### 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. Funding considerations for future years will be addressed during the planning, budgeting and performance management process at the agency level.

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#### Enclosures:

1. [Structure and Timelines for the Extended Storage and Transportation Regulatory Program](#)
2. Projected Resource Needs for the Extended Storage and Transportation Regulatory Program

## **Structure and Timelines Extended Storage and Transportation Regulatory Program**

The Extended Storage and Transportation (EST) Regulatory Program encompasses the EST Safety and Security Project and the Long-Term Waste Confidence (WC) Update Project. Figure 1-1 depicts the general structure of the EST Regulatory Program. The timelines for each project represent staff's current understanding of the work scope and available resources.

### EST Safety and Security Project

This Project is principally focused on identifying and analyzing the technical and regulatory information needed to ensure effective regulation of EST. The staff is examining technical areas associated with multiple renewals of fixed-term, dry storage licenses and certificates to address age-related degradation of dry cask storage systems, structures, and components. The staff will begin work on security issues after the current independent spent fuel storage installation security rulemaking is completed. The key timeframes for the EST Safety and Security Project are as follows:

- Identification of Technical Information Needs Associated with Extended Storage and Transportation (2011-2015)

The initial phase of this Project involves identification and prioritization of technical information needs. In May 2012, the staff issued for public comment its draft report, "Identification and Prioritization of Technical Information Needs Affecting Potential Regulation of Extended Storage and Transportation of Spent Nuclear Fuel." The staff has initiated work in some key high-priority areas, including the potential for stress corrosion cracking of stainless steel in marine environments, the effects of residual moisture after drying, and the need to develop improved thermal models of dry storage systems. The staff is developing a research plan to address the technical information needs in coordination with planned work by the U.S. Department of Energy, industry, participants in the Electric Power Research Institute's Extended Storage Collaboration Program, international groups, and other stakeholders. This area is closely coordinated with parallel staff activity on process improvements for the existing licensing process for spent nuclear fuel (SNF) storage and transportation, and with the impact analyses for the WC environmental impact statement (EIS). In 2012 and 2013, the staff will examine the potential impact of the technical investigations on both the plans for the WC EIS and the current regulatory framework for storage and transportation.

- Identification of Regulatory and Potential Policy Issues Associated with Extended Storage and Transportation (2012-2016)

This phase will identify the regulatory and potential policy issues that may affect the existing regulatory framework to address issues associated with multiple license renewals. This effort will entail a systematic examination of the existing regulations and guidance. The staff began planning this work in 2012. Because the significance of technical information needs depends on the potential regulatory impact, the staff expects that this task will inform the prioritization and timing of the research to resolve technical information needs. Likewise, the timeframe for resolution of the technical needs will affect the schedule for completing the

identification of regulatory and potential policy issues. The staff will engage the Commission as needed when issues are ready for Commission consideration.

- Revisions to Regulatory Framework (2014-2018)

In this phase, the staff will complete supporting documentation and prepare the necessary changes to guidance and, if needed, regulations. Presently, the staff believes that the current regulatory framework used to renew current licenses (i.e., first renewal) provides a basic framework to regulate the management of SNF and high-level waste for multiple renewal periods. As technical, regulatory, and policy issues are resolved, the staff will revise guidance and staff qualification and training accordingly. The current planned time frame for this phase assumes that potential changes to regulations supporting EST will be relatively limited. If a major rulemaking is deemed necessary, the staff will extend the time frame for this phase. This phase also includes completion of deferred work, including security assessments for EST, review of financial assurance for extended storage, development of domestic codes and standards, and identification of state-of-the-art technology incentives and possible risk-informed enhancements to 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." The planned time frame also assumes that the staff will begin its review of potential changes to security for EST no later than FY 2015, and that a major rulemaking will not be needed in this area.

#### Long-Term WC Update Project

This Project focuses on the development of an EIS and a potential change to the WC decision and rule. The NRC staff explained its current plan for the EIS in a draft report published for public comment in December 2011, entitled "Background and Preliminary Assumptions for an Environmental Impact Statement – Long-Term Waste Confidence Update."

The proposed WC EIS differs in several ways from other NRC EISs and comparable EISs prepared by other agencies. These differences contribute to the challenge of communicating to stakeholders about the complexity of the possible long-term update and its relationship to both the National Environmental Policy Act (NEPA) process and NRC's regulation of SNF storage. In particular, the proposed EIS is not directly connected to any NRC licensing action or other regulatory oversight action. However, to develop an evaluation of impacts associated with longer-term storage of SNF that would begin in the future (mid-century) and continue for about 200 years, the staff must make assumptions for that time period about the regulatory environment and technical aspects of SNF storage and transportation. As described in SECY-11-0029 and in the staff's draft report on the long-term WC update, the staff is proposing to construct a set of scenarios to assess the impacts of SNF and high-level waste storage and transportation. These scenarios are not alternatives to, or proposals for, any specific NRC action, but simply represent a range of possible future conditions for consideration in the EIS. Finally, based on the EIS and other factors, the Commission may decide to update the WC rule or, alternatively, conclude that no changes to the current WC rule are needed.<sup>1</sup>

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<sup>1</sup> The validity of the current rule is being challenged in the United States Court of Appeals for the District of Columbia Circuit.

The staff will engage the Commission as needed on this Project as issues arise. The key time frames for the Project are as follows:

- Activities to Develop Preliminary EIS Scope (2011-2013)

The staff has begun and will continue its activities to develop and refine the proposed scope of the EIS. Activities completed during this phase include the development of the draft and final background and assumptions report mentioned above. In preparing for formal scoping under the NEPA, the staff will develop additional documents to describe in greater detail the staff's proposed scope and methodology for the EIS. These documents will be publicly available to facilitate the scoping process.

- Formal NEPA Scoping Process (2013-2014)

The formal NEPA process begins with publication of a *Federal Register* "Notice of Intent" to prepare the EIS. The staff expects to hold scoping meetings at multiple locations beginning no sooner than late 2013 and to develop a scoping summary report over the following year. In addition and as practicable, the staff will begin work on the EIS during the scoping process.

- Develop and Publish Draft EIS, Draft Decision, and Proposed Rule (2014-2017)

Staff efforts during this period include development of the draft EIS, possible draft WC decision, and a possible proposed rule to reflect any substantive changes in the decision. If a rulemaking is warranted for this update, the process to develop the proposed rule would take place in parallel with development of the draft EIS. The substance of the draft WC decision, as well as the specific language of a proposed rule, if needed, will not be determined until the staff has developed the draft EIS sufficiently to understand the range of potential impacts. For a final EIS to be completed in 2019, the staff anticipates that a draft EIS, draft WC decision, and proposed rule would have to be published for public comment no later than 2017.

- Develop and Publish Final EIS, Final Decision, and Final Rule (2018-2019)

The staff expects that most of the effort to develop the final EIS will be in reviewing, consolidating, and responding to public comments on the draft documents. The staff will publish the final EIS and, if applicable, the final WC decision and rule, in 2019. If the EST research being conducted in parallel develops information that could change one or more EIS conclusions, then the staff would develop a supplemental EIS.

**Figure 1-1: Extended Storage and Transportation Regulatory Program**

