

U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

PLAN FOR INTEGRATING SPENT NUCLEAR FUEL REGULATORY ACTIVITIES

Revision 00

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Enclosure 1

EXECUTIVE SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) has developed this Plan for Integrating Spent Nuclear Fuel Regulatory Activities (the Plan) to address future regulatory challenges related to the management of spent nuclear fuel (SNF) and high-level waste (HLW). This Plan is intended to assist the NRC in addressing ongoing revisions to the national strategy for ensuring public health and safety and the environment in managing SNF and HLW.

The purpose of the Plan is to assure that the NRC treats SNF and HLW regulation as a system of interrelated activities so that decisions made about one component or area of the back end of the nuclear fuel cycle adequately consider and integrate related components or areas.

Treating the interrelated systems and activities involved in the regulation of SNF and HLW as one integrated system can be more efficient and effective than regulating them individually. By coordinating the approach for regulation of SNF or HLW storage, potential reprocessing, transportation, and disposal, the NRC can improve the efficiency and effectiveness of NRC regulatory processes and provide stability and predictability for stakeholders in a dynamic environment.

In addition, the Plan provides an organized approach for sharing information and perspectives among, and collaborating with, internal stakeholders; other Federal agencies; State, local, and tribal governments; international partners; the industry; the public; and other interested stakeholders.

The Office of Nuclear Material Safety and Safeguards will manage implementation of the Plan. The activities described in the Plan will require the support of other NRC Offices. The Plan is envisioned as a living document and will be updated as needed.

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1. NEED FOR AN INTEGRATION PLAN

While the U.S. Nuclear Regulatory Commission (NRC) has been successful in providing safe and effective regulation for the management of spent nuclear fuel (SNF) and high-level waste (HLW) for the past 30 years, it has done so in a period of relative stability in terms of both legislative mandates and nuclear technology.

However, the Nation has now entered a period where the national policy for storing, reprocessing, and disposal of SNF and HLW is being reexamined. This reexamination may result in the need for extended SNF storage, transportation of older SNF, reprocessing, and revision to the regulatory framework for HLW. These developments may fundamentally alter programmatic and technological assumptions that govern the NRC's current approach to regulation of SNF and HLW.

As national policy for SNF and HLW management and nuclear technology continues to evolve, changes in NRC's regulatory requirements, practices, and framework for the back end of the fuel cycle will be necessary. Integration of future regulatory activities, including future regulations, will require that the key interfaces and interdependencies among evolving fuel cycle technologies and activities be well understood, and that future regulatory changes provide for consistent and compatible approaches across the core program areas, which are storage and transportation, reprocessing, and disposal.

To address these challenges, the NRC has developed this Plan for Integrating Spent Nuclear Fuel Regulatory Activities (the Plan) that incorporates a predictable and systematic process for integrating future regulatory activities for the core program areas.

2. OBJECTIVES AND SCOPE

The Plan provides a systematic approach to integrating regulatory activities for the back end of the nuclear fuel cycle (see Figure 1). The primary objective of the Plan is to facilitate integration of regulatory requirements across the core program areas by

- identifying critical interfaces and interdependencies across core program areas;
- identifying and filling regulatory gaps created by evolving national policies and industry practices
- increasing the efficiency and effectiveness of current and future regulations and regulatory practices by identifying and adopting common definitions, assumptions, and methodologies (to the greatest extent possible) across core program areas
- eliminating duplication of effort
- identifying impacts and consequences resulting from changes in regulatory programs
- enabling NRC's evolving regulatory framework for the back end of the fuel cycle to leverage the knowledge and operational experience of internal and external stakeholders

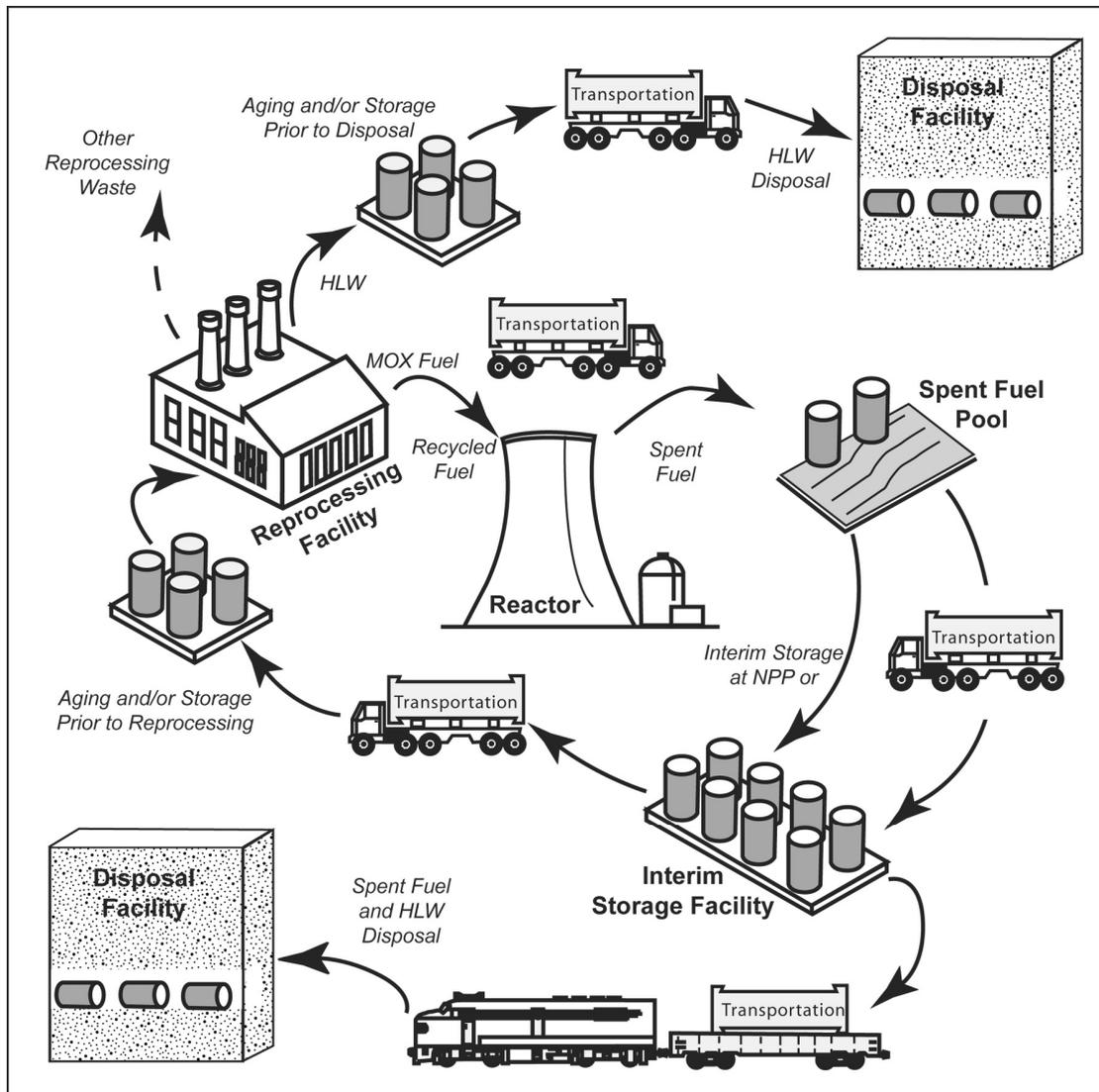


Figure 1: Back End of the Nuclear Fuel Cycle

While the Plan focuses primarily on the back end of the fuel cycle, activities on the front end of the nuclear fuel cycle (e.g., fuel design and manufacturing, reactor operations including wet storage of spent fuel) will be considered to the extent that they impact the safety, effectiveness, and efficiency of regulating transportation and storage (as discussed in February 2010 by the Commission in staff requirements memorandum (SRM) SRM-COMDEK-09-0001), reprocessing, and disposal of SNF and HLW.

A broad level of coordination among NRC offices, as well as among Federal agencies, is needed to implement this Plan because longstanding assumptions regarding SNF and HLW regulation are being reconsidered. Thus, NRC staff will pursue close collaboration with other Federal agencies to ensure that the regulatory implications of these changing assumptions are understood and that NRC regulations continue to provide for the safe and secure management of SNF and HLW.

3. INTEGRATION PROCESS

The assessment tool described in Appendix A provides a systematic integration process to help NRC staff identify and analyze interfaces and interdependencies across core program areas for the purpose of identifying new and emerging issues, and develop actions to resolve the identified issues.

Resources and funding necessary to accomplish actions are identified, coordinated, and integrated with existing regulatory activities based on schedules and priorities established in coordination with Agency leadership. Appendix B presents the resource needs and major milestones for the core program areas.

Appendices C, D, and E provide the project plans and associated activities for storage and transportation, reprocessing, and disposal, respectively. These appendices will be updated as activities within these core areas progress and are further integrated through the implementation of this Plan.

4. CORE PROGRAM AREAS AND PLAN ACTIVITIES

NRC staff has identified an initial list of key activities under each core program area that would likely form an integral part of any future regime for integrating spent fuel regulatory activities. These include

- Storage and transportation
 - the licensing of dry storage facilities for SNF for extended periods
 - certifying shipping containers for transporting SNF that has been stored for extended periods
- Reprocessing — developing a regulatory framework to support the licensing of reprocessing facilities
- Disposal — revising the existing regulatory framework for HLW to prepare for future regulatory actions.

NRC staff will use the analytical tool described in Appendix A to assure that its recommendations regarding future regulatory activities for the storage, transportation, reprocessing, and disposal of SNF and HLW are fully integrated, consistent, and compatible.

5. PLAN CONSIDERATIONS

Although the basic interfaces and interdependencies within the back end of the fuel cycle likely will remain the same, individual activities may change significantly in response to improvements in technology and to changes in external factors such as national policy or legislation. The NRC staff has identified some external factors that may significantly affect implementation of the regulatory integration process in future years in the areas of storage, reprocessing, and disposal:

- Public concerns that the implications of long-term storage of HLW at reactor sites have not been considered appropriately.

- Industry has notified the NRC that it may submit applications for reprocessing SNF at some point within the next decade.
- Proliferation concerns remain regarding some types of potential SNF reprocessing approaches, and a consensus has not emerged regarding the use of fast reactor technology or its implications for nonproliferation.
- Some forms of commercial SNF or HLW may not be amenable to commercial reprocessing.
- There appears to be an evolving national waste disposal strategy over the next five years, although the current international consensus will continue to support geological disposal.
- Recommendations on disposal from the Blue Ribbon Commission on America's Nuclear Future are not expected to deviate significantly from the Administration's current disposal position.
- Final recommendations from the Blue Ribbon Commission for managing the back end of the nuclear fuel cycle are not expected before January 2012.
- Legislative changes may affect the NRC's regulatory oversight of the disposal of SNF and HLW from defense activities.
- The waste reclassification rulemaking, scheduled to begin around 2014, may reexamine how wastes (e.g., reprocessing and greater-than-Class-C wastes) are classified and what kind of disposal technology is required.

Several of these factors may alter assumptions about the underlying fuel cycle that the current NRC regulatory framework has been developed to address. For example, the NRC has not yet developed a regulatory framework for extended dry storage or updated the regulations for reprocessing SNF. However, deferral of a geologic repository necessitates that SNF will remain in storage for a much longer period of time than originally anticipated. Industry's renewed interest in reprocessing will require NRC to evaluate its regulatory framework, and revise it as necessary, to be prepared to license and oversee such facilities. These and other similar fundamental potential changes in the fuel cycle could require alteration of the conceptual model of the fuel cycle as represented in Figure 1. This Plan intends to use the integration process described in Appendix A to provide a flexible framework for effectively assessing and responding to such changes in the back end of the fuel cycle.

6. INVOLVEMENT OF STAKEHOLDERS

The NRC staff recognizes the importance of involving internal and external stakeholders in successfully integrating SNF and HLW regulatory activities. Stakeholders include internal stakeholders; Federal agencies; State, local, and tribal governments; international partners; the industry; the public; and other interested stakeholders. Communication with international technical experts and regulatory bodies will provide insights and lessons learned regarding regulation of SNF and HLW. To be acceptable, the Plan

- must assure the safety and security of licensee activities and that the environment is protected
- should seek to achieve its safety, security, and environmental requirements in an effective and efficient manner that reduces unnecessary burden on licensees
- should have the confidence of the public and potential co-regulators, such as Department of Transportation and State governments

NRC staff will actively seek input and feedback from stakeholders during the ongoing implementation and evolution of the Plan. To facilitate effective communication with stakeholders, NRC staff will

- develop and align key messages for the implementing programs
- identify key target audiences for input/feedback
- develop appropriate communication tools to coordinate the timely and effective dissemination of information with key stakeholders and the public
- provide opportunities that encourage interested parties to provide input/feedback on evolving issues (such as long-term storage and new reprocessing methods)

In developing key messages, NRC staff will build upon existing messages developed for established programs for spent fuel transportation, storage, reprocessing, and disposal. NRC staff's outreach efforts will also seek to maintain and leverage existing external networks that have been developed for spent fuel transportation, storage, reprocessing, and disposal.

Key target audiences will be selected to consider their specific knowledge, experiences, and insights for use in developing (i) appropriate safety and security licensing bases and regulations, (ii) ways to increase public confidence, and (iii) methods for reducing unnecessary burdens on licensed activities. These audiences include industry, State governments, and public interest groups. In selecting target audiences for input and feedback, NRC staff will continue to implement the Commission's Policy on Principles of Good Regulation to assure that participation in NRC activities represents a fair and balanced approach. In addition, NRC staff is also considering developing web-based tools to disseminate information on planned activities and will host public meetings as needed.

APPENDIX A: INTEGRATION PROCESS

This integration process will be used to promote integration of regulatory activities relating to the phases in the back end of the fuel cycle (as shown in Section 2). The assessment tool described in this Appendix provides a systematic integration process to help NRC staff identify and analyze interfaces and interdependencies across fuel cycle phases and related activities, identify new and emerging issues, and develop NRC actions to resolve the identified issues. New and emerging stakeholder issues are also part of this systematic integration process and are analyzed using a similar assessment tool. The assessment tool was patterned after the International Atomic Energy Agency's methodology.

Although this Plan for Integrating Spent Nuclear Fuel Regulatory Activities (the Plan) focuses on the back end of the fuel cycle, the front end of the nuclear fuel cycle (e.g., fuel design and manufacturing, reactor operations including wet storage of spent fuel) is considered to the extent that it impacts the effectiveness and efficiency of regulating SNF and HLW.

The integration process is composed of the following four steps.

- (1) Identify the phases of the fuel cycle (e.g., storage, transportation, reprocessing, and disposal) and related activities to be analyzed.
- (2) Assess the regulatory needs by establishing where new and emerging issues exist within, and between, fuel cycle phases and related activities.
- (3) Identify the actions required to address the new and emerging issues and the responsible organizations.
- (4) Define products, milestones, and resources needed to accomplish the actions.

Figure A-1 is an example of an assessment tool that NRC staff will use as we move forward in integrating these activities. This assessment tool is used to analyze the interface of each phase of the back end of the fuel cycle with the other phases.

		Reactor	Reactor Spent Fuel Pool	Onsite Dry SNF Storage (short or long term)	Offsite Dry SNF Storage (short or long term)	Reprocessing	Reprocessing Low Level Waste Storage and Disposal	Onsite SNF Storage (short or long term)	Offsite SNF Storage (short or long term)	Ultimate Disposal	Transportation
		A	B	C	D	E	F	G	H	I	J
Reactor	1	X									
Reactor Spent Fuel Pool	2		X								
Onsite Dry SNF Storage (short or long term)	3			X							
Offsite Dry SNF Storage (short or long term)	4				X						
Reprocessing	5					X					
Reprocessing Low Level Waste Storage and Disposal	6						X				
Onsite SNF Storage (short or long term)	7							X			
Offsite SNF Storage (short or long term)	8								X		
Ultimate Disposal	9									X	
Transportation	10										X

Figure A-1: Integration Assessment Tool

To implement the integration process, the NRC staff will establish a review team comprising knowledgeable and experienced technical and licensing representatives from each division from the Office of Nuclear Material Safety and Safeguards and, as appropriate, other NRC Offices. As a group, the review team members will perform the following activities:

- Expand the assessment tool to include the fuel cycle phases and related activities to be analyzed.
- Discuss every cell in the assessment tool to determine whether a fuel cycle phase or interface issue exists. For example, using the assessment tool in Figure A-1, assess the interfaces between fuel cycle phases by considering the items in the rows of the assessment tool for their influence on the items in the columns of the assessment tool. For identification purposes, cell E2 in Figure A-1 represents the interaction of reprocessing on a reactor spent fuel pool. The shaded cells containing an “X” indicate null cells and should not be discussed.
- If a new or emerging issue is identified, enter an “I” in the corresponding cell to indicate that an issue exists. Referencing the specific cell by its letter/number

designation, clearly describe the issue in separate documentation. If no new or emerging issue is identified, enter an "N" in the corresponding cell to indicate that no issue was identified.

- Identify and document possible sources that might have an impact on the new or emerging issues that may offer potential solutions or approaches. This can include the identification of other NRC Offices or Divisions that have the requisite expertise or other resources to assist in resolving identified the new or emerging issues.
- Identify the NRC Offices and Division responsible for addressing the new or emerging issues.

The NRC Office and Division responsible for the addressing the new or emerging issues will do the following:

- Design a detailed plan to address the new or emerging issues and identify any needed resources. The detailed plan may involve the use of resources from other NRC Offices and Divisions.
- Develop an integrated, high-level summary of the proposed resources, budget, and schedule based on these detailed plans.
- Update the review team as to the results of the detailed planning process.

Ongoing changes in external circumstances will require periodic reassessment of the NRC staff's plans for integrated regulation of SNF. The NRC staff intends to perform reassessments quarterly or on an as-needed basis (e.g., based upon decisions by other key stakeholders, changes in national SNF regulation, changes in national law regarding nuclear waste policy, etc.).

Figure A-2 is another example of the assessment tool that NRC staff will use during the integration process, which will identify new and emerging stakeholder concerns or issues regarding phases of the back end of the fuel cycle or related activities. In this example, the rows of the matrix list the phases and related activities, while the columns list the stakeholders. The NRC staff will follow the same assessment process as described above. Transparency and openness are important NRC values. Therefore, the NRC staff plans to identify and evaluate new and emerging stakeholder concerns and issues concurrently with the assessment of fuel cycle phases to provide an integrated approach to timely interaction with stakeholders. This figure will provide information for us to focus our resources as we recognize that not all concerns or issues will be of the same level of interest to all stakeholders.

		Internal Stakeholders	Federal Agencies	States	Local Government	Tribal Government	International Partners	Industry	The Public	Other Parties
		A	B	C	D	E	F	G	H	I
Reactor	1									
Reactor Spent Fuel Pool	2									
Onsite Dry SNF Storage (short or long term)	3									
Offsite Dry SNF Storage (short or long term)	4									
Reprocessing	5									
Reprocessing Low Level Waste Storage and Disposal	6									
Onsite SNF Storage (short or long term)	7									
Offsite SNF Storage (short or long term)	8									
Ultimate Disposal	9									
Transportation	10									

Figure A-2: Interfaces Between Fuel Cycle Phases and Stakeholders

Figures A-1 and A-2 may be modified based on changes in national policy regarding extended SNF storage, transportation, reprocessing, and disposal. However, the basic approach to integrated assessment of NRC capabilities to regulate phases in the back end of the fuel cycle will remain valid under reasonably foreseeable national policy options.

APPENDIX B: RESOURCES AND MILESTONES

This appendix presents the resource requirements, milestones, and schedules for the Plan for Integrating Spent Nuclear Fuel Regulatory Activities. Resources are projected for fiscal year (FY) 2010 and FY 2011.

The staff notes that the schedules and resources are premised on continuing initiatives that are already underway in FY 2010, and implementing many activities at the start of FY 2011. The project plan and schedule will also be assessed periodically to determine the need for revisions based on potential resource limitations, significant developments and findings of gap assessments and reviews, stakeholder participation, changes in industry plans, changes in national policy, or any future direction by the Commission. The staff will provide updates of progress and any significant changes to the project plan at the annual NMSS Program Briefs for the Commission.

Table B-1 presents the budgeted and projected resource requirements. Table B-2 lists the major activities and milestones.

Table B-1: Budgeted and Projected Resource Requirements (FY2010 – 2011)¹

Activity	FY 2010 Budget			FY 2011 Request ²		
	\$M	FTE	Total	\$M	FTE	Total
Long Term Storage and Transportation	1.15	2.0	1.45	3.40	21.1	6.58
Final Disposition of HLW	3.90	13.0	5.86	3.37	11.0	5.03
Reprocessing ³	1.11	2.5	1.49	1.63	12.3	3.48
Total by Year	6.16	17.5	8.80	8.40	44.4	15.09
Grand total FY 2010-2011	\$23.89M					

¹ Table reflects direct resources provided in the business lines of New Fuel Facilities, Integrated Spent Fuel Management, and Spent Fuel Storage and Transportation. Overhead and corporate support are allocated at the business line level and cannot be displayed in this table.

² Includes resources requested in the FY 2011 President's Budget plus a shortfall for research activities that will either be addressed through reprogramming or the project plan will be prioritized and reduced.

³ Costs reflect only regulatory framework development and do not include the resources that might be involved in conducting a licensing review of a reprocessing facility application.

Table B-2: Integrating Spent Nuclear Fuel Regulatory Activities and Milestones

EXTENDED STORAGE AND TRANSPORTATION	
Regulatory Process Improvements (near term)	06/2015
Extended Storage and Transportation Program Review	
Phase 1 – Regulatory Gap Assessment	03/2014
Phase 2 - Research and Technical Analyses	12/2015
Phase 3 – Regulatory Technical Bases and Guidance	09/2017
Phase 4 – Potential Rule Changes	09/2020
REPROCESSING	
Develop Regulatory Basis for Rulemaking	03/2012
Develop Topical Report/Impact Statement	09/2015
Rulemaking/Guidance	09/2015
DISPOSAL	
Identify key technical issues and develop risk insights	09/2011
Develop technical capabilities	09/2011
International Perspectives	09/2011

APPENDIX C: EXTENDED STORAGE AND TRANSPORTATION

Background

Currently, more than 50 independent spent fuel storage installations across the United States store more than 45,000 spent nuclear fuel assemblies and greater-than-Class-C waste in more than 1,200 dry storage casks. These installations operate under both site-specific licenses and the general license granted to all reactor licensees. Many reactor facilities have reached their spent fuel pool capacity limits and will continue to rely on dry cask storage as an interim spent fuel management solution to maintain operational capability. It now appears that spent fuel storage at utility sites could be necessary for a period of time beyond an interim dry cask storage period of 60 years. Therefore, it is important to bolster or confirm the technical and regulatory basis of the U.S. Nuclear Regulatory Commission's (NRC's) regulatory framework to support extended periods of storage and transportation in the areas of safety, security, and environmental protection.

Objective

Enhance the technical and regulatory basis for extended storage and transportation (EST) in the areas of safety, security, and environmental protection.

Activities and Schedule

In February 2010, the Commission issued staff requirements memorandum (SRM) SRM-COMDEK-09-0001, which directed NRC staff to undertake a thorough review of the regulatory programs for spent fuel storage and transportation to evaluate their adequacy for ensuring safe and secure storage and transportation of spent nuclear fuel for extended periods beyond the 120 years considered up to this point. The SRM also directed NRC staff to undertake research to bolster the technical bases of the NRC's regulatory framework for extended storage periods; identify risk-informed, performance-based enhancements that will increase the predictability of regulatory processes; investigate ways to incentivize the processes to encourage adoption of state-of-the-art technology for storage and transportation; consider opportunities for comparing and, where appropriate, harmonizing international standards for transportation and storage; and conduct the review in a transparent and collaborative manner with NRC stakeholders. The SRM requires NRC staff to develop a project plan for Commission approval, including objectives, plans, potential policy issues, projected schedules, performance measures, and projected resource requirements.

NRC staff has developed a project plan, for Commission approval, that will include a number of activities shared with other NRC offices. The plan was provided to the Commission on June 15, 2010 for consideration (COMSECY-10-0007, "Project Plan for the Regulatory Program Review to Support the Extended Storage and Transportation of Spent Nuclear Fuel," [ML101390216]). This section will be updated to reflect key components of the project plan (related to integration with reprocessing and disposal activities), upon approval and further Commission direction. The project plan includes two main goals to enhance the regulatory programs for both interim storage and extended storage and transportation: (1) identification and implementation of regulatory

improvements to current licensing, inspection, and enforcement programs; and (2) enhancement of the technical and regulatory basis of the existing regulatory framework, and modification as necessary, to support extended storage and transportation. If the Commission approves the project plan, the following activities will be performed to support these goals:

Fiscal Year 2010

- Perform a Lean Six Sigma review of the general license process for spent fuel storage approvals. The NRC staff plans to complete review in 2010.
- Perform gap assessments for aging research to identify additional research needs and analyses to support an enhanced extended storage and transportation (EST) framework. The NRC staff plans to complete the assessment in the third quarter (3Q) of fiscal year (FY) 2011
- Participate in the Electric Power Research Institute (EPRI)-led Extended Storage Collaboration Program (as an independent Agency) to identify research needs and observe a long-term cask demonstration program. This is a long term activity for several years during development of an EST regulatory framework.
- Engage international counterparts and external stakeholders on EST issues. This is a long term activity for several years during development of an EST regulatory framework.

Fiscal Year 2011

- Initiate comprehensive reviews of the site-specific storage licensing review process and the inspection and enforcement processes. The NRC staff plans to complete the licensing reviews in FY 2011 and inspection reviews in FY 2012.
- Initiate short-term laboratory research on important aging phenomena related to EST and complete in FY 2015.
- Initiate an environmental gap assessment for EST in 2Q FY 2011 and complete in FY 2012.
- Initiate a risk-informing and performance based gap assessment in 2Q FY 2011 and complete in FY 2012.
- Initiate a domestic codes and standards gap assessment in 3Q FY 2011 and complete in FY 2012.
- Initiate activities with international counterparts to compare regulatory frameworks and share research. This is a long term activity for several years during development of an EST regulatory framework.

Fiscal Year 2012

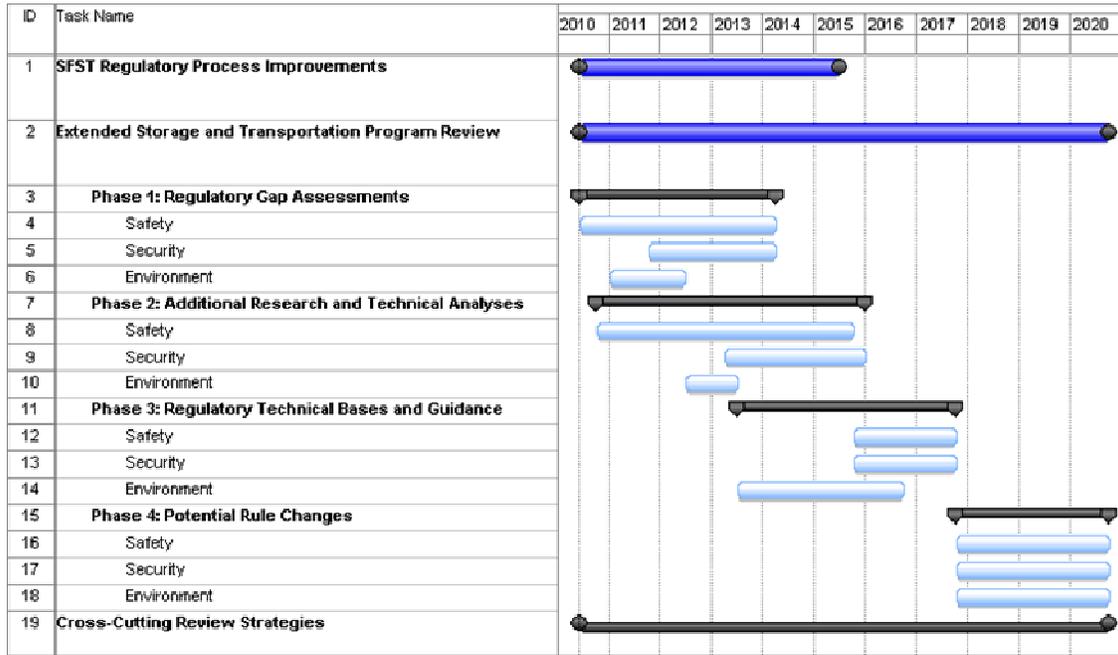
- Revise licensing and inspection procedures and guidance for near-term regulatory process improvements and complete in FY 2014.

-
- Initiate a security gap assessment for EST and complete in FY 2014.
 - Initiate a review of recent technology approvals to identify ways to encourage adoption of state-of-the-art technologies by industry.

Fiscal Year 2013-2015

- Complete regulatory bases and guidance for near-term process improvements and issue associated rule changes to 10 CFR Parts 71 and 72, if appropriate.
- Initiate a financial gap assessment in FY 2013 for EST and complete in FY 2014.
- Complete all gap assessments and a significant amount of associated research, analyses, and potential environmental assessments in support of an enhanced technical and regulatory basis for EST (by FY 2017), followed by rule changes if appropriate.

Figure C-1: Extended Storage and Transportation Activities Schedule¹



¹ Based on timeline presented in the executive summary for the Project Plan for the Extended Storage and Transportation Regulatory Program Review.

APPENDIX D: REPROCESSING

Background

Reprocessing could be a significant component of a revised national strategy for managing spent nuclear fuel. The U.S. Nuclear Regulatory Commission (NRC) has limited experience in regulating reprocessing facilities. Operations of licensed reprocessing facilities in the United States ceased decades ago.

Several years ago, NRC staff became aware of a renewed interest in reprocessing. In mid-2008, two nuclear industry companies informed the agency of their intent to seek a license for a reprocessing facility in the U.S. An additional company expressed its support for updating the regulatory framework for reprocessing, but stopped short of stating its intent to seek a license for such a facility. Shortly thereafter, NRC staff determined that if NRC received an application for a reprocessing facility in the next decade or so, the separation technology would need to be based on deployable, mature separation techniques. This premise informed the NRC staff's review of the regulations to determine the NRC's readiness to license these reprocessing facilities. NRC staff performed a regulatory gap analysis and summarized it in SECY-09-0082, "Update on Reprocessing Regulatory Framework—Summary of Gap Analysis," dated May 28, 2009 (ADAMS ML091520243). The staff's gap analysis identified 14 "high" priority gaps that must be resolved to establish an effective and efficient regulatory framework. The regulatory gaps broadly cover four main areas: (1) reprocessing waste-related issues, (2) physical protection and material control and accounting, (3) risk, and (4) licensing issues.

Building on the gap analysis, efforts are currently underway to develop a regulatory (technical) basis to pursue rulemaking that would enable the effective licensing and regulation of reprocessing facilities. The status of the regulatory basis development and estimated schedule for completing the reprocessing regulatory development are summarized in a May 14, 2010, memorandum to the Commission (ADAMS ML101110444).

Objective

Develop a predictable and effective regulatory framework for reprocessing that would adequately protect public and worker health and safety and the environment and promote the common defense and security.

Activities and Schedule

Development of the regulatory framework comprises public outreach, international knowledge sharing, and development of the regulatory basis and subsequent rule. These three main areas are interdependent and essential for a thorough regulatory framework. NRC staff will perform the following activities to support the objective (Figure D-1 presents the reprocessing activities schedule):

Fiscal Year 2010

- The staff is planning public workshops to gather feedback on its regulatory basis development. The staff intends to conduct workshops in the fall of calendar year 2010 in different geographic locales to accommodate a variety of stakeholders. Additional workshops may be warranted depending on stakeholder interest.
- A regulatory and technical information-sharing session with safety authorities and operators in France is planned for September 2010.
- NRC staff began preliminary environmental review work in May 2010.

Fiscal Year 2011

- The NRC staff plans to complete a draft regulatory basis to support rulemaking by September 2011.

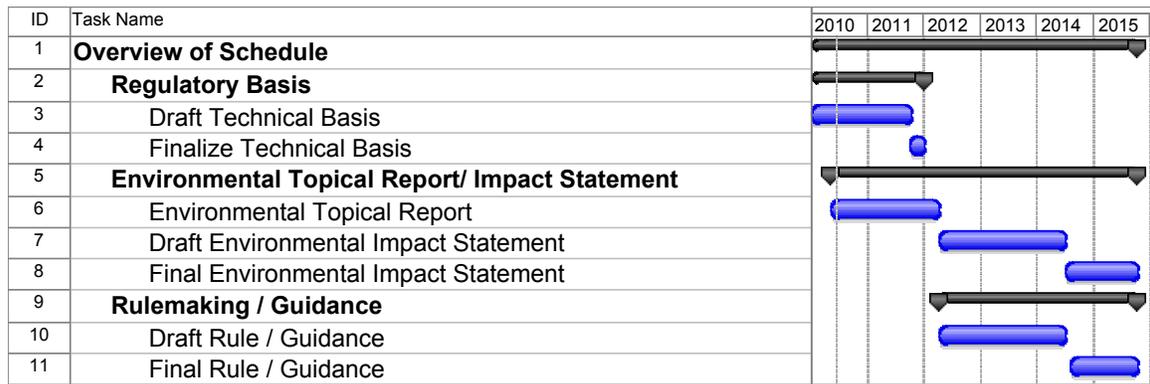
Fiscal Year 2012

- NRC staff reviews and finalizes regulatory basis document by March 2012.
- NRC staff issues proposed reprocessing rule for comment on March 2012.
- NRC staff continues to develop the regulatory framework at a pace commensurate with industry intentions, provided that the necessary resources can be prioritized and allocated

Fiscal Year 2013-2015

- If the Commission directs staff to proceed in establishing the regulatory framework for reprocessing facilities, the final rule and associated activities (environmental impact statement, implementation guidance) may be completed by the end of FY 2015.

Figure D-1: Reprocessing Activities Schedule



APPENDIX E: DISPOSAL

Background

Ongoing reevaluation of national policy may result in the need to reexamine the U.S. Nuclear Regulatory Commission's (NRC's) regulatory framework for high-level waste (HLW) disposal. The timely development of a regulatory framework permits a level of regulatory stability that can promote the development of national policy alternatives for HLW management. Although the NRC does not drive the considerations of alternatives, the NRC needs to be prepared to regulate them.

Any deferral of the development of a national geologic repository is likely to involve extended storage of spent nuclear fuel (SNF). Such extended storage will likely have an impact on many parameters (e.g., thermal signature, fuel aging properties) that would play a role in the performance of any ultimate disposal option. An alternative site or different disposal method would likely involve a different geological medium with its own specialized engineered barrier system. Likewise, the ultimate goal of any reprocessing/recycling system would be to remove fissile material and other long-lived radioisotopes from the spent nuclear fuel. Actinide removal would affect the radioisotope inventory, waste form, facilities design, materials requirements, and possibly the timeframe of regulatory interest in a repository analysis. The removed residual wastes would still need to be disposed of in some manner.

Objective

Develop appropriate technical bases and have appropriate skills available to support future activities related to the disposal of SNF and HLW.

Activities and Schedule

NRC staff will perform the following activities to support the objective (Figure E-1 presents the disposal activities schedule):

Fiscal Year 2010

Because the direction of national policy is uncertain, it is essential that the NRC have the flexibility to adapt rapidly. In addition, the NRC may be asked to provide input, possibly on short notice, to external stakeholders such as the Blue Ribbon Commission on America's Nuclear Future. Three activities have been identified for completion in fiscal year (FY) 2010:

- (1) Identification of the regulatory and technical issues to address potential alternatives to the nation's HLW repository site. A technical report documenting the findings will be produced by September 30, 2010.
- (2) Development of an assessment tool ("Flexible Performance Assessment"—FPA) that allows a scoping-level evaluation of the regulatory and technical aspects of various spent fuel and HLW disposition scenarios that may be identified by the Blue Ribbon Commission on America's Nuclear Future. The tool will have the flexibility to assess a wide range of geologic media and engineered

system materials and disposal concepts. A beta version of the flexible assessment tool and a draft user's guide will be produced by September 30, 2010.

- (3) Investigation and participation in select international activities to develop an understanding of the methods various countries use to deal with the regulatory, technical, environmental, legal, and programmatic aspects of waste disposal, as well as an understanding of the impact of public and political opinion and the socioeconomic programs developed to address such concerns. A survey of international programs that identifies key aspects of selected programs and their relevance to regulation of SNF disposal in the US will be produced in late FY 2010 or early FY 2011.

Fiscal Year 2011

- The regulatory, technical, environmental, and programmatic issues identified in FY 2010 will be assessed and a path forward developed to resolve any issues that can be addressed.
- The beta version of the flexible assessment tool developed in FY 2010 will be tested, exercised, and refined to address disposal scenarios involving alternative fuel cycles and characteristics, geological media, and engineered barrier systems.
- Based on the information gained from international involvement and the results of the survey of international programs performed in FY 2010, a strategy for international involvement will be developed and implemented.

Fiscal Year 2012

Activities in FY 2012 will be informed by the findings of the Blue Ribbon Commission on America's Nuclear Future, which is expected to report back to the Secretary of Energy by January 2012. Work will continue in FY 2012 to address the issues identified in FY 2010. In addition, effort will be expended on exercising the flexible assessment tool for various fuel forms, geologic media, and different fuel cycles and documenting the risk insights generated by use of the tool.

Fiscal Years 2013 to 2015

Activities in the out years are highly dependent on the national waste strategy. By this time (i.e., FY 2013-2015), the staff expects the NRC to have addressed the regulatory and technical issues identified in FY 2010 and to have an effective assessment tool to evaluate the issues associated with alternative disposal scenarios. To increase efficiency and productivity, the NRC staff will build upon international experience that could be applied to any new national waste strategy. Most of the effort needed during these years will likely be associated with rulemaking to address issues identified in earlier years and precicensing activities involving site characterization activities and other similar work.

After more specific direction on the national policy becomes available, significant effort could be required to develop an understanding of key technical issues related to other

geological media and engineered barrier systems for a possible geologic repository. The flexible assessment tool initiated in FY 2010 can provide valuable insights. Nevertheless, targeted laboratory studies and field investigations of the relevant features, events, and processes affecting the performance of a potential geologic repository will be needed to support the development of risk insights for rulemaking and licensing of a potential repository.

Figure E-1: Disposal Activities Schedule

