

BASE-455

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

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In re:

License Renewal Application Submitted by

Entergy Nuclear Indian Point 2, LLC,
Entergy Nuclear Indian Point 3, LLC, and
Entergy Nuclear Operations, Inc.
-----X

Docket Nos. 50-247-LR; 50-286-LR

ASLBP No. 07-858-03-LR-BD01

DPR-26, DPR-64

February 10, 2011

STATE OF NEW YORK ANSWER IN SUPPORT OF
THE ADMISSION OF CLEARWATER AND RIVERKEEPER'S
PROPOSED WASTE CONFIDENCE CONTENTIONS

CLEARWATER EC-8, SC-2, EC-9, SC-3,
RIVERKEEPER EC-6, TC-3, EC-7, TC-4

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On January 24, 2011, the Hudson River Sloop Clearwater (“Clearwater”) and Riverkeeper, Inc. (“Riverkeeper”) submitted for the Board’s consideration Clearwater EC-8 (Riverkeeper EC-6) and Clearwater SC-2 (Riverkeeper TC-3), and Clearwater EC-9 (Riverkeeper EC-7) and Clearwater SC-3 (Riverkeeper TC-4). The State of New York files this timely statement in support of the admission of these contentions pursuant to section F(1) of the ASLB’s July 1, 2010 Scheduling Order.

OVERVIEW OF SPENT NUCLEAR FUEL

The toxicity of high level spent nuclear fuel to humans is “greater than that of any hitherto familiar industrial poison.” *Industrial Radioactive Waste Disposal*, Summary-Analysis of Hearings, Joint Committee on Atomic Energy, Congress of the United States, at 6 (Aug. 1959). “At massive levels, radiation exposure can cause sudden death.” *NEI v. EPA*, 373 F. 3d 1251, 1258 (D.C. Cir. 2004)(internal citations omitted). Exposed spent nuclear fuel will deliver a lethal dose nearly instantly if it has cooled less than one year; within about one minute if it has cooled for 5 years; in about 2 minutes if it has cooled for 10 years; and in about 5 minutes if it has cooled for 50 years. Spent fuel that has cooled for 100 years can still deliver a lethal dose after 25 minutes of exposure. United States Department of Energy, *Statement of Position of the United States Department of Energy, Proposed Rulemaking on the Storage and Disposal of Nuclear Waste (Waste Confidence Rulemaking)*, DOE/NE-0007, page II-56, Table II-4 (April 15, 1980); U.S. Department of Energy, *Dose Ranges (rem) Chart* (June 2010).¹

Even “[a]t lower doses, radiation can have devastating health effects, including increased

¹ Available at: http://lowdose.energy.gov/images/ig_pics/DoseRangesJune2010.pdf. The calculations set forth above are based on the surface dose rates in rem/hr from the DOE report and the lethal dose rate of approximately 800 rem from DOE's *Dose Ranges* chart. The lethal dose of 800 rems means that 50% of the population exposed at that rate will die within 30 days

cancer risks and serious birth defects such as mental retardation, eye malformations, and small brain or head size.” *NEI*, 373 F.3d at 1258. Although a few isotopes in spent nuclear fuel have short half-lives of only several hours or a few days, “[r]adioactive waste and its harmful consequences persist for time spans seemingly beyond human comprehension.” *Id.*

The U.S. commercial reactor fleet discharges 2,300 tons of spent fuel annually. Nuclear Energy Institute, *Nuclear Waste: Amounts and On-Site Storage* (January 2011).² By the end of 2010, approximately 65,000 tons of spent nuclear fuel was being stored at more than 50 sites in 32 states. John Kessler, *Used Nuclear Fuel: Inventory Projections*, Blue Ribbon Commission on America’s Nuclear Future, Slides 6, 7 (Aug. 19, 2010).³ The total volume of spent nuclear fuel discharged from the current fleet may exceed 133,000 tons, stored at more than 71 sites by 2050.⁴ John Kessler, *Used Fuel Projections and Considerations*, EPRI, Slide 7 (June 9, 2010).⁵

Because the fuel is hot and radioactive when placed in the pools, cooler water is continuously added to the pools to prevent the water from boiling and to buffer the radiation. If the water boils or drains away, the zirconium cladding that holds the spent-fuel pellets may melt or catch on fire, potentially causing a major release of radiation. National Academy of Sciences, *Public Report, Safety and Security of Commercial Spent Nuclear Fuel Storage*, The National Academies Press, at 38-40 (2006).

even with medical treatment.

² Available at:

http://www.nei.org/resourcesandstats/nuclear_statistics/nuclearwasteamountsandonsitestorage/

³ Available at: [http://brc.gov/Transportation Storage SC/docs/TS SC 08-19 mtg/2 EPRI Used Fuel Inventory-August 2010 final John%20Kessler.pdf](http://brc.gov/Transportation%20Storage%20SC/docs/TS_SC_08-19_mtg/2_EPRI_Used_Fuel_Inventory-August_2010_final_John%20Kessler.pdf)

⁴ This estimate assumes that no new reactors are built and that current reactors operate for 60 years.

⁵ Available at:

<http://www.nuclearinfrastructure.org/resources/symposium2010/2010JohnKessler.pdf>

A severe accident at a full spent fuel pool can have comparable consequences to those of a major core melt accident. *A Safety and Regulatory Assessment of Generic BWR and PWR Permanently Shutdown Nuclear Power Plants*, at 4-4 (NUREG/CR-6451) (August 1997); *Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants*, at 3-34 (NUREG-1738) (February 2001) (“Early fatality consequences for spent fuel pool accidents can be as large as for a severe reactor accident even if the fuel has decayed several years.”). Notwithstanding the great risk of a catastrophic failure, poor maintenance has caused radionuclides to be released to the groundwater, with unascertainable health and environmental risks, including leaks at Indian Point Units 1 & 2, which were detected in 2005.

The risks of fuel fires and release of radioactive materials can be minimized by transfer to dry cask storage, but the nuclear industry has objected to accelerating the implementation of this safer storage mechanism due to cost. Letter from Paul A. Gaukler to NRC Secretary, *Comments in Support of Nuclear Energy Institute’s Opposition to the State of Massachusetts’ Petition for Rulemaking*, Docket No. PRM-51-10 (ML070810384). Approximately 80% of spent nuclear fuel is currently stored in the higher risk spent fuel pools. *Used Fuel Projections and Considerations*, at Slide 20.

Even as spent fuel is transferred to the relatively safer dry cask storage, the risk of contamination remains. Like spent fuel pools and all other temporary means of storage, dry casks are located outside the protective containment shells that surround nuclear power reactors, making them susceptible to fire and radiological release from a wide range of conditions, including intentional attacks. *Safety and Security of Commercial Spent Nuclear Fuel Storage*, at 8, 31, 40-43.

These ongoing problems with spent fuel storage at reactor sites are particularly and uniquely important at Indian Point. Not only does the site already contain spent fuel that was generated as early as 1962, from Unit 1, but spent fuel storage facilities at Indian Point have already released tritium, strontium-90, and nickel-63 into groundwater, which are being discharged into the Hudson River. U.S. Nuclear Regulatory Comm'n Region 1, Inspection Report Nos. 05000003/2007010 and 05000247/2007010, Indian Point Nuclear Generating Station Units 1 & 2, at 1-4 (May 13, 2008), (ML081340425). In addition, Indian Point has the highest concentration of population within 50 miles of the site of any nuclear power plant in the United States. See, e.g., Atomic Energy Commission ("AEC"), *Population Distribution Around Nuclear Power Plant Sites*, Figure 2: Typical Site Population Distribution (5-50 Miles) (April 17, 1973); Federal Emergency Management Agency, *Nuclear Facilities & Population Density Within 10 Miles* (June 2005). Thus, the long-term storage of spent fuel at the Indian Point site presents site-specific safety and environmental concerns which should be, but have not been, addressed in the FSEIS. As noted in the proposed Clearwater and Riverkeeper contentions and as noted below, there are many potential safety and environmental issues associated with long term onsite storage of spent fuel at Indian Point for which environmental and safety impacts will differ from other sites and for which mitigation measures will require site-specific considerations. For example, the leaking spent fuel pool storage at Indian Point has already required Entergy to move spent fuel to dry cask storage even though such spent fuel storage relocation is not required for other sites. Entergy, *Analysis of Proposed License Amendment and Technical Specification Change Request Regarding Removal of Spent Fuel from Indian Point Unit No. 1 and Drain Down of the Spent Fuel Pool*, Attachment I to NL-08-052 (June 26, 2008) (ML081840349).

AEC AND NRC EFFORTS TO ADDRESS WASTE DISPOSAL

For many decades the Nuclear Regulatory Commission (“NRC”), and its predecessor, the AEC, have struggled with the question of how to address the safety and environmental issues associated with the high level nuclear waste produced by operating nuclear power plants in light of the fact that there is no approved place to permanently dispose of that waste. In a 1979 case involving placement of additional nuclear waste in the spent fuel pools at Vermont Yankee and Prairie Island, the Court of Appeals for the District of Columbia Circuit instructed the Commission to determine whether there was reasonable assurance that an off-site storage solution would be available by 2007-2009. *Minnesota v. NRC*, 602 F.2d 412, 418, 420 (D.C. Cir. 1979). Until December 23, 2010, NRC answered this question by making a determination that a permanent waste repository would be available by a date certain and that, until that date, spent fuel could be stored safely and without substantial adverse environmental impacts either at the reactor site or at off-site independent spent fuel storage facilities. NRC based these determinations on “confidence findings,” which in turn relied on various safety and environmental studies purportedly showing that, as a generic matter, such temporary and time-limited spent fuel storage was safe and environmentally acceptable. *See Hudson River Sloop Clearwater, Inc. and Riverkeeper, Inc.’s Joint Motion for Leave to Add New Contentions Based Upon New Information and Petition to Add New Contentions at 1-17* for a detailed discussion of this history.

As of December 23, 2010, that analysis has changed, because, after decades of erroneously predicting the operation date for a permanent high level waste repository, NRC has come to realize that such predictions are no longer possible. *See Waste Confidence Update*, 75 Fed. Reg. 81037 (Dec. 23, 2010); Vote of Commissioner Svinicki re SECY-09-0090 – Final

Update of the Commission's Waste Confidence Decision (Sept. 24, 2010),⁶ ("this is a particularly difficult time to be in the prediction business."). Prior to December 23, 2010, other changes also occurred that raise serious questions about NRC's ability to make generic findings regarding either the safety or environmental impacts of long term spent fuel storage at nuclear power plant sites. For example, the environmental socioeconomic impact of indefinite spent fuel storage at reactor sites is inherently site-specific and not subject to generic resolution, as NRC Staff's Generic Environmental Impact Statement for License Renewal ("GEIS") recognizes. See 10 C.F.R. Part 51, Table B-1 of Appendix B of Subpart A. There are also ongoing and increasing problems of radioactivity leaking into the ground at nuclear power plants, including leaks from spent fuel storage facilities, such as some of the leaks at Indian Point. See *Waste Confidence Update*, 75 Fed. Reg. 81037 at 81070-71 (Dec. 23, 2010) (listing known spent fuel pool leaks around the country). In short, the landscape surrounding spent fuel storage at reactor sites and its impacts on safety and the environment at those sites has changed dramatically.

~~The contentions proposed by Clearwater and Riverkeeper address these and other changes and their implications for the proposed relicensing of Indian Point. They are undoubtedly relevant to the fundamental decisions that must be made before a decision on relicensing can be made - i.e. whether:~~

there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB, and that any changes made to the plant's CLB in order to comply with this paragraph are in accord with the Act and the Commission's regulations. These matters are:

(1) managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under §54.21(a)(1); and

⁶ Available at: <http://www.nrc.gov/reading-rm/doc-collections/commission/cvr/2009/2009-0090vtr-cls.pdf>.

(2) time-limited aging analyses that have been identified to require review under §54.21(c).

(b) Any applicable requirements of subpart A of 10 CFR part 51 have been satisfied.

10 C.F.R. §§ 54.29(a) and (b).

The State of New York submits that Clearwater and Riverkeeper have raised material issues regarding the safety of long term storage of spent fuel at Indian Point, particularly for the period beyond 60 years from plant shutdown, and regarding the environmental impact of such storage.⁷ Neither Entergy, nor NRC, either generically or site-specifically, has addressed these issues. Whether the issue is the integrity of spent fuel pools, the deterioration of the fuel rods or the cement in dry casks, the protection of the spent fuel from the threat of sabotage, or the on-site and off-site environmental impacts of spent fuel storage on the site, there is no record, no consideration and, most importantly, there are no findings that from 60 years after Indian Point is shut down, spent fuel still onsite will be (1) safe or (2) without any significant environmental impact. In addition, contrary to the provisions of the National Environmental Policy Act (“NEPA”), there is no consideration of alternatives to the continued storage of spent fuel at the Indian Point site after plant shutdown.

⁷ While the State agrees with Clearwater and Riverkeeper that the rule by which NRC concluded that storage of spent fuel at the reactor sites during license renewal and for 60 years after reactor operation has ceased is safe and without significant environmental impact (other than offsite socioeconomic land use impacts during plant operation and thereafter) is legally deficient, the focus of this pleading is the alternative contentions Clearwater EC-9 (Riverkeeper EC-7) and Clearwater SC-3 (Riverkeeper TC-4) that focus on the lack of any safety or environmental findings for the period after 60 years from plant shutdown.

RELEVANT FACTS

After years of considering the question of whether spent fuel can be stored at reactor sites safely and without substantial adverse environmental impact, the best NRC is now able to conclude is that such on-site storage is acceptable for 60 years after plant operations cease. While on its face this appears to be a substantial period of time, it is actually not much time at all, at least not in the case of Indian Point.

First, the relevant finding in 10 C.F.R. § 51.23(a) provides:

The Commission has made a generic determination that, if necessary, spent fuel generated *in any reactor* can be stored safely and without significant environmental impacts for at least 60 years beyond the licensed life for operation (which may include the term of a revised or renewed license) *of that reactor* in a combination of storage in its spent fuel storage basin and at either onsite or offsite independent spent fuel storage installations.

Id. (emphasis added). Thus, the safety and environmental finding is reactor by reactor, not site by site. This is particularly relevant at Indian Point because the IP 1 reactor was shut down in 1974 and will reach the end of its 60 years of allegedly safe and environmentally benign spent fuel storage in just 23 years - *i.e.*, in 2034 - even before IP 3 would cease operations if its license were renewed.

Second, even when the time is counted from the shutdown of IP 2 or IP 3, the time is much shorter than it may appear. According to two reports prepared by one of Entergy's consultants, the decommissioning plan for Unit 2 and Unit 3 involves a period of 28 years to physically remove the spent fuel from the site to another repository if there is no license renewal. See August 13, 2009 Entergy package submitted to NRC on decommissioning funding (ML092260736) (package containing ML092260720 and ML092260723) and Entergy Document Ell-1583-006 Preliminary Decommissioning Cost Analysis For The Indian Point

Energy Center, Unit 3 (Dec. 2010) at 10 (collectively, "Indian Point Decommissioning Reports"). If the licenses are renewed, the expected period for removal of all the spent fuel would be at least 40 years, conservatively assuming that spent fuel will be generated at a somewhat slower rate during license renewal. Thus, of the 60 years that NRC has studied, 28 to 40 of them will be needed just to remove the spent fuel from the site.

Third, removal of spent fuel from Indian Point cannot begin until there is a place to put it. The current plan, as outlined in the decommissioning reports for Units 2 and 3 is for removal to begin when a high level nuclear waste repository is available. *See Indian Point Decommissioning Reports*. None has been selected and there is no predictable date by which one will be selected. However, the Commission recently stated that it cannot have confidence in a target date because it cannot predict when the societal and political obstacles to a successful repository program will be overcome, but that "[o]nce those obstacles are overcome, the Commission has confidence that a repository can be sited, licensed, and constructed within 25–35 years." 75 Fed. Reg. 81037, 81041, n.3. Assuming, optimistically, that "societal and political obstacles" (which have not been overcome in the last 30 years) are overcome by the end of *another* 30 years - *i.e.*, by 2041 - the earliest date spent fuel could start to be removed from Indian Point would be 2066, or more likely, according to the NRC estimate, 2076. In either event, spent fuel would remain on-site well beyond 60 years after all of the reactors at Indian Point cease to operate. The surrounding population will be subjected to the safety and environmental risks of spent fuel storage on-site for at least 12 additional years if license renewal is approved, as the total quantity of spent fuel stored at the site will increase by approximately 50%.

ARGUMENT

I. 10 C.F.R. § 51.23(b) DOES NOT BAR CLEARWATER AND RIVERKEEPER'S CONTENTIONS

10 C.F.R. § 51.23(b) merely prohibits consideration in this proceeding of the environmental impacts and safety concerns associated with spent fuel storage “for *the period* following the term of the reactor operating license or amendment.” 10 C.F.R. § 51.23(b) (emphasis added). The phrase “the period” - read in the context of the regulation and the language of § 51.23(a) - clearly refers to the 60-year period for which the Commission found:

spent fuel generated in any reactor can be stored safely and without significant environmental impacts *for at least 60 years* beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin.

10 C.F.R. § 51.23(a) (emphasis added). Since the focus of Clearwater and Riverkeeper's alternate contentions is the period after 60 years – that is, the indefinite period of spent fuel storage at Indian Point - they are not barred by the existing regulation.

Second, 10 C.F.R. § 51.23(b) limits consideration of the environmental impact of spent fuel storage at the reactor site after shutdown:

within the scope of the generic determination in paragraph (a) of this section, no discussion of any environmental impact of spent fuel storage in reactor facility storage pools or independent spent fuel storage installations (ISFSI) for the period following the term of the reactor operating license or amendment or initial ISFSI license or amendment for which application is made, is required in any environmental report, environmental impact statement, environmental assessment or other analysis prepared in connection with the issuance or amendment of an operating license for a nuclear reactor.

Id. (emphasis added). Neither 10 C.F.R. § 51.23(a) nor the Waste Confidence Decision Update includes any discussion of the environmental impact or safety of the continued and indefinite storage of spent fuel at the reactor site after 60 years. Those impacts therefore cannot fairly be

said to be “within the scope of the generic determination in paragraph (a).” 10 C.F.R. § 51.23(a).

II. THE FSEIS AND SER FAIL TO CONSIDER THE ENVIRONMENTAL AND SAFETY IMPACTS OF SPENT FUEL STORAGE AT INDIAN POINT FOR THE PERIOD BEGINNING 60 YEARS AFTER PLANT SHUTDOWN IN VIOLATION OF NEPA AND THE AEA

As noted above, the 60 year window for safe and environmentally benign spent fuel storage is substantially consumed by events that have been set in motion before this hearing began. If license renewal is approved there will unavoidably be a period, beyond 60 years after plant shutdown in 2033 and 2035, when additional spent fuel, generated during license renewal, will still be on the site. There are no findings, generic or site-specific, about the safety of such extended spent fuel storage or of the environmental impacts of such extended spent fuel storage. While NRC was permitted to dismiss considerations related to spent fuel storage at individual reactor sites beyond what it evaluated in the Generic Environmental Impact Statement for License Renewal (NUREG-1437) (*see New York v. NRC*, 589 F.3d 551 (2d Cir. 2009)) that decision was explicitly based on the fact that NRC had “considered the relevant studies, and . . . took account of the relevant factors.” *New York*, 589 F.3d at 555. However, for the period beyond 60 years from plant shutdown, NRC has no studies, has not taken account of relevant factors and has made no findings. Most importantly, as discussed below, the Commission acknowledges that additional studies are needed to account for the period beyond 60 years after plant shutdown.

In the Waste Confidence Decision Update, the Commission noted that studies of the impact of long term storage of spent fuel, beyond 120 years of storage – which would mean beyond 60 years after plant shutdown in the case of a renewed license plant⁸ – are essential but

⁸ A plant with a forty year operating license that stores spent fuel on-site will, at the end of 40 years, have some spent nuclear fuel that will be 40 years old. If a plant’s operating license

have yet to be completed:

But the longer-term rulemaking and study of storage for more than 120 years that the Commission directed the staff to start in its Staff Requirements Memorandum (SRM) (SRM-SECY-09-0090, M100915; September 15, 2010) will result in the Commission having more information in a timely fashion should additional adjustments to the Waste Confidence Decision and Rule prove necessary.

75 Fed. Reg. at 81035. Thus, there is no question that an evaluation of the safety and environmental impact of spent fuel beyond 60 years after plant shutdown has not been done.

In directing NRC Staff to undertake this further review of spent fuel storage safety and environmental impacts, the Commission “[n]ot[ed] its assurance in the adequacy of the current waste confidence rule” and

finds it prudent for the staff to begin a separate longer-term rulemaking effort. This longer-term rulemaking effort would update the waste confidence rule to account for storage at onsite storage facilities, offsite storage facilities, or both, that would address impacts of storage beyond a 120 year time frame with the ultimate timeframe, which could be two or three hundred years or more, ~~determined by the staff's technical judgment during the course of the analysis.~~ As with elimination of the target date from the rule and Finding 2, initiation of this rulemaking effort, however, does not mean that the Commission is in any way assuming or endorsing indefinite, onsite storage. Rather, the purpose of this rulemaking is to ensure that the waste confidence rule continues to be fully informed by the current circumstances and scientific knowledge, and also to provide long-term stability to the rule. The primary focus of the analysis should be on the potential environmental impacts resulting from the use of currently available technologies for spent fuel management, transportation, and disposal. However, the staff should also assess how the proposed project might reflect the potential application of advanced spent fuel management technologies, including approaches that would enable short-lived species to be separated from spent fuel and stored until they decay, as well as the potential for application of alternative approaches to disposal, such as a deep borehole. To support this longer-term waste confidence update, the staff should prepare a draft Environmental Impact Statement (EIS). The lead responsibility for this rulemaking effort should be with the Executive Director for Operations.

is renewed pursuant to 10 C.F.R. § 54.31 for 20 additional years, a portion of that fuel will be 60 years old when the plant is finally shutdown. The Waste Confidence Decision Update finds that for an additional 60 years the spent fuel will be safe and environmentally benign. Thus, the need for a study of the safety of spent fuel that is 120 years old.

SRM-SECY-09-0090, *Final Update of the Commission's Waste Confidence Decision*, M100915, at 2 (Sept. 15, 2010) (ML102580229) [Att. 1].⁹

The Staff has prepared an analysis of the types of issues that will need to be addressed in its effort to fulfill the Commission's directive to study the safety and environmental implications of spent fuel storage at the reactor beyond 60 years after plant shutdown. COMSECY-10-0007 and Enclosure 1, Project Plan for the Extended Storage and Transportation Regulatory Program Review - Revision 0 - June 2010 (June 15, 2010) ("Project Plan for the Regulatory Program Review to Support Extended Storage and Transportation of Spent Nuclear Fuel")("Extended Storage Review Plan") (ML101390216) [Att. 2]. This plan lists numerous serious and as yet unanalyzed safety and environmental issues associated with spent fuel storage beyond 60 years after plant shutdown:

While a spent fuel cask system maintains an independent confinement system, the spent fuel cladding is credited as the primary fission product barrier during interim storage and transportation. However, industry has limited operational experience with the transport of [high burnup] HBU fuel, and there is little operational or experimental data regarding HBU fuel behavior during storage and transportation.

* * *

The scope of data varies with potential long-term degradation phenomena of cask [systems, structures and components] SSCs, such as concrete, steel, resins, seal materials, and unique basket materials. These materials and structures will be credited with providing adequate structural integrity, confinement of [spent nuclear fuel] SNF, criticality safety, shielding, and heat removal for SNF during EST [extended storage and transportation]. These SSCs will need to continue to perform their safety functions for normal conditions, accidents, and natural phenomena over EST timeframes.

One phenomena of consideration will likely be the aging effects on cladding integrity in various combinations of extended wet storage and dry storage modes.

Id. at 10.

⁹ The citation "[Att. ___]" refers to the Attachments accompanying this answer and the declaration of AAG Adam Dobson.

The long-term cask demonstration program could provide confirmation and validation of the extrapolations that were made from short-term data, and could identify any previously unrevealed aging effects detrimental to the performance of dry cask storage systems during extended periods. This would ensure that appropriate monitoring, mitigation, corrective actions, and other regulatory actions are implemented during extended storage operations. An understanding of aging mechanisms (e.g., concrete degradation or corrosion of materials) will allow NRC to formulate requirements and guidance for time-limited aging analyses and aging management programs that will be needed from licensees to allow EST operations. The longterm cask demonstration program may also identify potential aging issues (in addition to analytic predictions) inside the cask system that could require physical monitoring of internal components and fuel during extended storage.

Id. at 11.

The staff plans to conduct a EST gap assessment for SNF storage security, which will explore technical issues, such as (1) whether the potential degradation of the spent fuel storage cask system will impact cask response to security scenarios, (2) whether the potential degradation of the spent fuel will impact fuel response (and resultant release fractions) to security scenarios, (3) whether the cooling and radioactive decay of the SNF will, at some point, make it necessary to consider diversion as a credible scenario.

Id. at 15.

~~The staff plans to also conduct gap assessments for SNF transportation security to (1) review the current threat assessment for transport, (2) analyze the impact of the potential increase in the number of shipments (considering a potential regionalized storage facility scenario), (3) study the implications of shipping fuel following an extended period of storage, including an analysis of when potential fuel and/or materials degradation begins to impact the cask response to security scenarios, and whether fuel cooling results, at some point, in the introduction of additional credible threat scenarios, and (4) look for RIPB enhancements.~~

Id. at 16. These are just some of the many safety and environmental issues that have not been analyzed in the GEIS, as part of the waste confidence rule, in the SER or the FSEIS. For purposes of the latter, NRC Staff relies on the now-outdated version of 10 C.F.R. § 51.23(a) (*see e.g.* FSEIS, Vol. 1 at A-138 to A-139) and has made no effort to amend the FSEIS in light of the significant and new information regarding the absence of any predicted date by which a high

level waste repository will be available.

In its FSEIS and SER, NRC Staff proposes to allow interim approval of requests to generate new spent fuel by way of license renewals, even though NRC Staff does not know whether the newly generated spent fuel will be able to be stored on-site safely and without significant environmental impact during all the time it will have to remain on-site. Neither the Atomic Energy Act nor NEPA allows a major federal action to proceed while postponing a significant portion of the analyses required to determine whether the proposed action is safe, its likely adverse environmental impacts and what alternatives, if any, exist to the proposed action.

1. The Atomic Energy Act Requires Definitive Findings That Operation of Indian Point Will Provide Adequate Protection Of The Public's Health and Safety

Many decades ago, the United States Supreme Court recognized that, pursuant to Section 182(a) of the Atomic Energy Act (42 U.S.C. § 2232(a)), although definitive safety findings may not be required before issuance of a construction permit, such definitive findings must be made before issuance of an operating license. *Power Reactor Development Co. v. International Union of Elec., Radio and Mach. Workers, AFL-CIO*, 367 U.S. 396, 397 (1961) (“It is clear from this provision that before licensing the operation of [a] reactor, the AEC will have to make a positive finding that operation of the facility will provide adequate protection to the health and safety of the public.”); *see also Union of Concerned Scientists v. NRC*, 735 F.2d 1437, 1451 (D.C. Cir.1984), *cert. denied*, 469 U.S. 1132 (1985) (holding that material licensing issues may not be excluded from a licensing hearing). Neither the SER nor the FSEIS purports to make a finding that storing spent fuel at the Indian Point site for more than 60 years after the plant ceases to operate is safe and can be done with adequate protection for the public health and safety as required by 42 U.S.C. § 2232(a).

Since it is now possible that spent fuel generated during the proposed license renewal period will still be on-site 60 years after the plant has ceased to operate and since the Commission and NRC Staff acknowledge that additional studies must be completed in order to permit the Commission or this Board to determine whether such extended onsite spent fuel storage will be safe and to determine what measures will have to be taken to assure its safety, no license renewal can be issued for Indian Point. By allowing operation beyond 2013 and 2015, NRC would be allowing creation of spent fuel, for which it has no basis to make a safety finding for the period beyond 60 years after plant operations cease - a violation of the AEA.

2. The National Environmental Policy Act and NRC Regulations Require Consideration of All Relevant Factors That Bear on the Decision

NEPA, 42 U.S.C. §§ 4321-37, requires all federal agencies to examine environmental impacts that could be caused by their discretionary actions. The Supreme Court has identified NEPA's twin aims as (1) obligating a federal agency to consider every significant aspect of the environmental impact of a proposed action and (2) ensuring that the federal agency informs the public that it has indeed considered environmental concerns in its decision-making process. *Baltimore Gas and Electric Co. v. Natural Resources Defense Council*, 462 U.S. 87 (1983). As a federal agency, NRC must comply with NEPA. Compliance with NEPA imposes continuing obligations on an agency after it completes an environmental analysis. An agency that receives new and significant information casting doubt upon a previous environmental analysis must reevaluate the prior analysis. This requirement is codified in NRC's own regulations, which require NRC Staff to "independently evaluate and be responsible for the reliability of all information used in the draft environmental impact statement." 10 C.F.R. § 51.70(b); *see also* 10 C.F.R. § 51.92(a). Not surprisingly, NRC's license renewal application regulations, at 10 C.F.R.

§ 51.95(3), provide that an FSEIS shall be issued “after considering any new information relevant to the proposed action.” Pursuant to § 51.91(a)(1)(iii) and (iv), the FSEIS shall include factual corrections and supplementation or modification of analyses in response to comments on a draft environmental impact statement.

An environmental impact statement must contain “high quality” information and “accurate scientific analysis.”¹⁰ This requires every federal agency, including NRC, to ensure “the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements.” 40 C.F.R. § 1502.24. To take the required “hard look” at a proposed project’s effects, an agency may not rely on incorrect assumptions or data.¹¹ Furthermore, NEPA obliges a federal agency to consider “the relevant factors” that bear on its decision, regardless of whether they are within the agency’s control.¹²

~~In this case, the FSEIS totally ignores the environmental impacts of, and alternatives to, storage of spent fuel at the reactor site beyond 60 years after the reactor is shutdown. In fact, the FSEIS relies on the wrong version of 10 C.F.R. § 51.23 to assume that a high level waste repository will be available by 2025, even though NRC Staff knew full well that the rule would be changed within days of the FSEIS’s issuance. See FSEIS, Vol. 1 at A-160 to A-161:~~

In addition, on September 15, 2010, the Commission approved a revision to the agency’s ‘Waste Confidence’ findings and regulation, expressing its confidence that the nation’s spent nuclear fuel can be safely stored for at least 60 years beyond the licensed life of any reactor and that sufficient repository capacity will be available when necessary. However, until a revised final rule is issued, the

¹⁰ 40 C.F.R. § 1500.1(b); *Conservation Northwest v. Rey*, 674 F. Supp. 2d 1232, 1249 (W.D. Wash. 2009) (citing *Ctr. for Biological Diversity v. U.S. Forest Svc.*, 349 F.3d 1157, 1167 (9th Cir. 2003)).

¹¹ *Id.* at § 1500.1(b) (“Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA”); *Native Ecosystems Council v. U.S. Forest Svc.*, 418 F.3d 953, 964, 965 (9th Cir. 2005).

¹² *Conservation Northwest v. Rey*, 674 F. Supp. 2d 1232, 1251 (W.D. Wash. 2009) (citing *Idaho Sporting Congress*, 137 F.3d 1146, 1149 (9th Cir. 1998) (emphasis added)).

current determination under 10 CFR 51.23 remains in effect at this time and governs the consideration of this issue * * * Accordingly, while DOE has not yet specified an alternative to Yucca Mountain, there is every reason to believe that a permanent solution to the issue of spent fuel storage will be achieved. Further, until the DOE takes possession of it, the spent nuclear fuel will be safely stored at the nuclear power reactor site, subject to NRC oversight and [sic] regulation.

See also FSEIS, Vol. 1 at A-138:

'Further, the Commission believes there is reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty first century, and sufficient repository capacity will be available within 30 years beyond the licensed life for operation of any reactor to dispose of the commercial high-level waste and spent fuel originating in such reactor and generated up to that time.' While the Commission has initiated a rule making proceeding regarding the Waste Confidence Rule, the rule remains in effect at this time.

The FSEIS ignores the most fundamental findings of the new version of § 51.23 by relying on the rejected conclusion that a high level waste repository will be available by 2025 and thus spent fuel will not have to be stored at the plant site beyond 60 years after the plant is shutdown. The new version of § 51.23, of which NRC Staff was aware when it issued the FSEIS, leaves unexamined the fundamental question that the FSEIS casually asserts, without a shred of evidence or analysis, can be answered when it asserts that "nuclear fuel will be safely stored at the nuclear power reactor site." FSEIS, Vol. 1 at A-161. That bald assertion is directly contradicted by the Extended Storage Review Plan, authored by NRC Staff, that identifies a wide range of safety and environmental issues that must be examined and resolved before there is a basis to assert that spent fuel can be safely stored at the reactor site for more than 60 years after plant shutdown.

The Second Circuit has previously addressed the issue of whether under NEPA a major federal action by the NRC may be allowed to proceed on an interim basis pending completion of studies that are relevant to the environmental impact of the proposed action. *Natural Resources*

Defense Council, Inc. v. United States Nuclear Regulatory Comm'n, 539 F.2d 824 (1976),
vacated and remanded to determine mootness, 434 U.S. 1030 (1978).¹³ In that case, much like
the present situation, NRC had prepared a generic analysis of the environmental impacts of
taking a major federal action - in that case using mixed-oxide fuels for nuclear reactors. It had
completed its generic analysis (the Generic Environmental Impact Statement on Uranium and
Plutonium Mixed Oxide Fuel ("GESMO")) but acknowledged, as it does now, that additional
issues needed to be evaluated - in that case the threat of diversion of nuclear fuel by terrorists. In
rejecting the Commission's attempt to issue interim approval pending completion of its
environmental analysis the Court held:

we find that the portion of the order which allows the Commission to proceed to
grant interim commercial licenses for the use of mixed oxide fuel and related
activities prior to the completion of the GESMO study and the final decision on
wide-scale use would allow the commencement of major federal action without
the benefit of an adequate environmental impact statement. Accordingly, we
conclude that the decision to proceed to interim licensing is in violation of the
NEPA, and that portion of the order is reversed and remanded.

539 F.2d at 830. The Court also held a full impact analysis, including an alternative analysis, is a
sine qua non for proceeding with a major federal action:

the consideration of alternatives and of special hazards to the public health, safety
and welfare are vital to any impact statement, and numerous statements have been
overturned for their failure to address these questions. *See, e.g., Natural
Resources Defense Council v. Callaway*, 524 F.2d 79, 92-94 (2d Cir. 1975);
Natural Resources Defense Council, Inc. v. Morton, 148 U.S. App. D.C. 5, 458
F.2d 827, 833-34 (1972). In fact, this court has held that a consideration of
alternatives is required under NEPA whenever the agency action has an
environmental impact, even if no formal impact statement is filed; *see Trinity
Episcopal School Corp. v. Romney*, 523 F.2d 88, 93 (2d Cir. 1975) (requiring
compliance with NEPA for federal funding of urban renewal).

539 F.2d at 842.

¹³ NRDC's petition for review became moot after the federal government decided to
cease efforts to reprocess spent nuclear fuel.

In the current case, NRC Staff will undoubtedly argue that the Commission has not left the period beyond 60 years without findings because, they will likely claim, the Commission has determined that a permanent waste repository will be available “when necessary” and thus, should any environmental or safety problem arise with spent fuel storage at reactor sites, that will make the high level repository magically appear.¹⁴ But it remains unclear who will decide when it is “necessary” and if there will be sufficient time to select, approve, and build the waste repository after it becomes evident that onsite spent fuel storage is unsafe or environmentally disastrous. The Commission has surmised that from the unpredictable date of resolution of social and political issues it will take at least 25-35 years to site, license, and construct a high level waste repository. 75 Fed. Reg. at 81041, n.3. Add to that the 40 years needed to actually remove the spent fuel from the site and the idea that there will be no safety or environmental problems with long term spent fuel storage because the repository will be ready “when necessary” is nonsensical. This “when necessary” concept in the current Waste Disposal Decision Update and 10 C.F.R. § 51.23 is reminiscent of interim license criteria devised by the Commission to allow licensing of mixed-oxide facilities to proceed even before all the safety and environmental issues had been fully explored and alternatives considered. The Second Circuit then rejected, and this Board should now reject, any suggestion that such procedural tactics are a substitute for reasoned decision making:

The interim criteria which will be applied to mixed oxide fuel separation and fabrication require Commission inquiry as to whether the activity will place primary reliance on a favorable final decision in GESMO, whether the activity would foreclose safe-guards alternatives by committing resources, and whether delay in the conduct of the activity would adversely effect [sic] the “overall public interest.” *We find these criteria at best vague and at worst disingenuous.* An activity need not place primary reliance on a favorable decision on wide-scale use

¹⁴ Essentially this is the obverse of the famous line from the movie *Field of Dreams* -- not “if you build it, he will come,” but “if the waste comes, you will build a repository.”

for the activity to severely prejudice the ultimate decision. Second, we are unable to understand how the Commission will be able to determine that a given activity will not foreclose safeguards when those safeguards have not yet been designed or finalized. Finally, the "delay" criteria injects consideration of non-environmental public interest factors which could have the effect of foreclosing the outcome of the test's application.

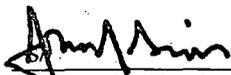
539 F.2d at 843 (emphasis added).

Thus, a central issue raised by Clearwater and Riverkeeper's proposed contentions is that it is a violation of NEPA and NRC regulations to allow a final decision on whether to authorize Indian Point to increase by almost 50% the amount of spent fuel that will be stored at the Indian Point site without *first* evaluating whether storage of that spent fuel at the reactor site will be safe and without significant environmental impact. Storage may well occur for more than 120 years after the spent fuel is generated since there is no longer a basis to conclude that storage will end sooner. Since the Commission concedes that the required analyses have not occurred, it cannot authorize the generation of spent fuel for which it has no basis to conclude that it will be safely stored for the period of such storage and will not create significant adverse environmental impacts for the period of such storage. It is not an answer that for the first 120 years from when the spent fuel is generated at Indian Point, it will be safe and environmentally benign, because, if the further study ordered by the Commission shows that after 120 years the spent fuel will not be safe or will create significant adverse environmental impacts, there will be no remedy and alternatives will be severely limited, since the spent fuel generated by license renewal of Indian Point will already exist. This is the inherent folly in allowing creation of a highly toxic and extremely long-lived hazardous waste *before* there is a solution in hand for safely disposing of it, *before* the full extent of its safety and environmental impacts are known, *before* alternatives can be fully explored, and *before* knowing the date on which a secure and environmentally

acceptable repository will be available.¹⁵ It is precisely to prevent major federal actions proceeding without analyzing such dangers to human health and the environment that the AEA and NEPA were enacted.

CONCLUSION

For the foregoing reasons, the State respectfully requests that the Board admit Clearwater and Riverkeeper's Joint Waste Confidence Contentions.



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February 10, 2011

¹⁵ Unlike the challenge in *NRDC v. U.S. Nuclear Regulatory Comm'n*, 582 F.2d 166, 170 (2d Cir. 1978), the purpose here is not to prohibit creation of more spent fuel because it is not safe or environmentally acceptable, but rather to require that NRC, at a minimum, complete its now planned evaluation of those questions *before* it decides whether to allow Entergy to generate more spent fuel during the period of extended operation.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

-----X
In re:

Docket Nos. 50-247-LR; 50-286-LR

License Renewal Application Submitted by

ASLBP No. 07-858-03-LR-BD01

Entergy Nuclear Indian Point 2, LLC,
Entergy Nuclear Indian Point 3, LLC, and
Entergy Nuclear Operations, Inc.

DPR-26, DPR-64

February 10, 2011
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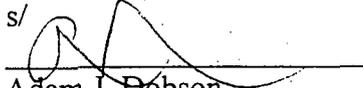
DECLARATION OF ADAM J. DOBSON

Pursuant to 28 U.S.C. § 1746, Adam J. Dobson hereby declares as follows:

1. I am an Assistant Attorney General for the State of New York, counsel for petitioner-intervenor State of New York in this proceeding.
2. Attachment 1 contains a true and correct copy of SRM-SECY-09-0090, Final Update of the Commission's Waste Confidence Decision, M100915 (Sept. 15, 2010) (ML102580229).
3. Attachment 2 contains a true and correct copy of Project Plan for the Extended Storage and Transportation Regulatory Program Review - Revision 0 - June 2010 and Enclosure 1 (COMSECY-10-0007) (June 15, 2010) (ML101390216).

Executed on February 10, 2011

s/


Adam J. Dobson

COPY

NYS Answer in Support of
Clearwater EC-8, SC-2, EC-9, SC-3 (Riverkeeper EC-6, TC-3, EC-7, TC-4)

Attachment 1

SRM-SECY-09-0090
Final Update of the Commission's Waste Confidence Decision, M100915
(Sept. 15, 2010)
(ML102580229)

September 15, 2010

MEMORANDUM FOR: Stephen G. Burns
General Counsel

R. W. Borchardt
Executive Director for Operations

FROM: Annette L. Vietti-Cook, Secretary /RAJ

SUBJECT: STAFF REQUIREMENTS - AFFIRMATION SESSION, 8:45 A.M.,
WEDNESDAY, SEPTEMBER 15, 2010, COMMISSIONERS'
CONFERENCE ROOM, ONE WHITE FLINT NORTH,
ROCKVILLE, MARYLAND (OPEN TO PUBLIC ATTENDANCE)

I. SECY-09-0090 – Final Update of the Commission's Waste Confidence Decision

The Commission¹ approved a final rule which updates the Commission's 1990 Waste Confidence findings and amends 10 CFR 51.23(a), subject to the changes below.

The following revisions should be made to 10 CFR 51.23 and Waste Confidence Findings (2) and (4):

§ 51.23: Temporary storage of spent fuel after cessation of reactor operation – generic determination of no significant impact.

- (a) The Commission has made a generic determination that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 60 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor in a combination of storage in its spent fuel storage basin and at either onsite or offsite independent spent fuel storage installations. Further, the Commission believes there is reasonable assurance that sufficient mined geologic repository capacity will be available to dispose of the commercial high-level radioactive waste and spent fuel generated in any reactor when necessary.

Finding 2: The Commission finds reasonable assurance that sufficient mined geologic repository capacity will be available to dispose of the commercial high-level radioactive waste and spent fuel generated in any reactor when necessary.

¹ Section 201 of the Energy Reorganization Act, 42 U.S.C. Section 5841, provides that action of the Commission shall be determined by a "majority vote of the members present." Chairman Jaczko, and Commissioners Apostolakis, Magwood and Ostendorff were present in the Conference Room. Commissioner Svinicki participated in the meeting via speakerphone.

Finding 4: The Commission finds reasonable assurance that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 60 years beyond the licensed life of operation (which may include the term of a revised or renewed license) of that reactor in a combination of storage in its spent fuel storage basin and either onsite or offsite independent spent fuel storage installations.

The Office of the General Counsel (OGC) should modify the statements of consideration (SOC) to reflect the Commission's decision and update the factual information contained in the SOCs. For example, the SOCs should explain that the Commission is removing the target date from the rule and Finding 2 because it is premature to predict a date at this time, particularly considering the uncertainties created by the significant political challenge of siting a high-level waste repository. The SOCs should make clear that removing the target date is not an assumption or endorsement of indefinite, onsite storage. In addition, the SOCs should explain use of the phrase "when necessary" in the rule and Finding 2. This explanation should reflect the Commission's confidence that there will be no temporal gap between when a repository will be necessary and the availability of sufficient repository capacity because the necessity of transitioning from storage of high-level waste and spent fuel to disposal will be discovered and understood as it approaches and mined geological repository disposal will have been developed in advance of that time. The SOCs should explain that this transition could result from federal action that may be triggered by any number of political, technical, legal, or environmental circumstances.

The final rule package should be submitted to the Commission for its information ten business days prior to sending it to the Office of the Federal Register for publication, and should include a redline-strikeout version.

(OGC)

(SECY Suspense:

11/15/10)

Noting its assurance in the adequacy of the current waste confidence rule, the Commission finds it prudent for the staff to begin a separate longer-term rulemaking effort. This longer-term rulemaking effort would update the waste confidence rule to account for storage at onsite storage facilities, offsite storage facilities, or both, that would address impacts of storage beyond a 120 year time frame with the ultimate timeframe, which could be two or three hundred years or more, determined by the staff's technical judgment during the course of the analysis. As with elimination of the target date from the rule and Finding 2, initiation of this rulemaking effort, however, does not mean that the Commission is in any way assuming or endorsing indefinite, onsite storage. Rather, the purpose of this rulemaking is to ensure that the waste confidence rule continues to be fully informed by the current circumstances and scientific knowledge, and also to provide long-term stability to the rule. The primary focus of the analysis should be on the potential environmental impacts resulting from the use of currently available technologies for spent fuel management, transportation, and disposal. However, the staff should also assess how the proposed project might reflect the potential application of advanced spent fuel management technologies, including approaches that would enable short-lived species to be separated from spent fuel and stored until they decay, as well as the potential for application of alternative approaches to disposal, such as a deep borehole. To support this longer-term waste confidence update, the staff should prepare a draft Environmental Impact Statement (EIS). The lead responsibility for this rulemaking effort should be with the Executive Director for Operations.

The staff should provide the Commission with a plan for this longer-term rulemaking. The plan should include staff's recommendation on the appropriate timeframe for the technical analysis, updated budget estimates, timelines for the rulemaking to begin as soon as possible, and any

resource impacts that this high-priority rulemaking would have on already-budgeted work. The plans and Fiscal Year 2011 resources for this longer-term rulemaking should be integrated and realigned, to the extent possible, with the staff's current efforts to examine extended storage and transportation of spent nuclear fuel resulting from COMSECY-10-0007. The staff's plan should also consider the schedule of the activities of the Department of Energy's Blue Ribbon Commission on America's Nuclear Future to ensure that the NRC can respond to potential modifications of national policy.

(EDO)

(SECY Suspense:

12/30/10)

The proposed longer-term rule and draft environmental impact statement should be sent to the Commission in a Notation Vote Paper.

cc: Chairman Jaczko
Commissioner Svinicki
Commissioner Apostolakis
Commissioner Magwood
Commissioner Ostendorff
CFO
OCAA
OCA
OIG
OPA
Office Directors, Regions, ACRS, ASLBP (via E-Mail)
PDR

NYS Answer in Support of
Clearwater EC-8, SC-2, EC-9, SC-3 (Riverkeeper EC-6, TC-3, EC-7, TC-4)

Attachment 2

COMSECY-10-0007
and Enclosure 1, Project Plan for the Extended Storage and
Transportation Regulatory Program Review - Revision 0 - June 2010
(June 15, 2010)
(ML101390216)

June 15, 2010

MEMORANDUM TO: Chairman Jaczko
Commissioner Svinicki
Commissioner Apostolakis
Commissioner Magwood
Commissioner Ostendorff

FROM: R. W. Borchardt /RA by Michael F. Weber for/
Executive Director for Operations

SUBJECT: PROJECT PLAN FOR THE REGULATORY PROGRAM REVIEW TO
SUPPORT EXTENDED STORAGE AND TRANSPORTATION OF
SPENT NUCLEAR FUEL

The purpose of this memorandum is to request Commission approval of the Project Plan for the Extended Storage and Transportation Regulatory Program Review in Enclosure 1. The staff developed this plan in response to staff requirements memorandum (SRM) COMDEK-09-0001, "Revisiting the Paradigm for Spent Fuel Storage and Transportation Regulatory Programs." In this SRM, the Commission directed the staff to develop a project plan to conduct a thorough review of the regulatory programs for spent nuclear fuel (SNF) storage and transportation, and to evaluate their adequacy for ensuring safe and secure storage of SNF for extended periods beyond 120 years. The Commission also directed the staff to undertake research to bolster the technical bases of the regulatory framework in support of extended periods, and to leverage ongoing improvement initiatives.

The staff has developed a plan for Integrating Spent Nuclear Fuel Regulatory Activities (ISNFRA) to address future regulatory challenges related to the management of SNF and high-level waste. The three core areas of the ISNFRA plan are storage and transportation, reprocessing, and disposal. As part of the ISNFRA plan, the staff will coordinate the extended storage and transportation regulatory program review with the reprocessing and disposal regulatory program activities, as appropriate, to address changes to national policy and industry programs related to SNF management.

The staff believes that the current regulatory framework can be enhanced to ensure the safety and security of extended storage and transportation with additional research, guidance, review processes, and potential rule changes. The project plan includes two main goals to enhance the regulatory programs for both interim storage and extended storage and transportation:

CONTACT: Michael Waters, NMSS/SFST
(301) 492-3297

(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.

The plan also details cross-cutting strategies that the staff will apply to help achieve the two main goals, as applicable. These strategies include applying risk-informed and performance-based (RIPB) enhancements, promoting development of domestic codes and standards, promoting international cooperation on extended storage and transportation regulatory issues, exploring incentives for industry adoption of state-of-the-art technologies, and engaging stakeholders. The staff plans to implement risk-informed enhancements using the "Risk-Informed Decision Making for Nuclear Material and Waste Applications" (RIDM), Revision 1 (ML080720238), as appropriate. The RIDM has been developed for generic use in Office of Nuclear Material Safety and Safeguards (NMSS) risk-informing activities, and provides a systematic process for evaluating the feasibility of risk-informing improvements and implementing risk insights into existing regulatory frameworks.

Further, Appendix A of the project plan identifies potential policy issues. These issues are related to the storage cask certification rulemaking process, the integration of transportation and storage safety design standards, maintaining fuel cladding integrity during the backend of the fuel cycle, and financial qualifications and assurance of licensees for extended storage and transportation. The staff plans to evaluate these issues as part of the project plan and present policy recommendations to the Commission, as warranted.

The staff has developed a seven-year plan for enhancing the technical and regulatory basis for extended storage and transportation by FY 2017. This would be followed by potential rulemaking activities, as warranted. The staff considered shorter time frames for enhancing the regulatory program, however, schedule constraints are influenced by the time needed to sequence various gap assessments and complete multiple research activities (e.g., high-burnup fuel research), participate in external research initiatives, engage international counterparts, and engage stakeholders and other interested parties in development of guidance and potential environmental assessments. The staff plans to implement the near-term regulatory improvements to guidance and procedures by late fiscal year (FY) 2013, with potential rule changes completed in FY 2015. These improvements would enhance the effectiveness of the current regulatory program for interim storage and transportation, and would also be durable in supporting future licensing and inspection activities related to extended storage and transportation. The staff also plans to complete aging research gap assessments in FY 2011 and environmental gap assessments in FY 2012. These and other gap assessments will systematically identify technical and regulatory differences between the current regulatory framework, and that needed to support extended storage and transportation in the future. These gap assessments will also inform the estimated time and effort that will be needed for enhancing the extended storage and transportation regulatory framework. Appendix B of the project plan provides an integrated overview of projected schedules for all activities.

The staff notes that one significant outcome of the various research studies may be identification of timeframes that require significant mitigation actions (e.g., replacement of cask components) to ensure continued safe storage and transportability. The staff has not yet identified any such timeframes, and has preliminarily selected an analytical timeframe of 300 years for the scope of the extended storage and transportation regulatory program review elements, such as extrapolating research data, conducting potential risk and environmental assessments, and developing aging management and design performance guidelines.

Prior to issuance of SRM-COMDEK-09-0001, the staff had several initiatives underway which will continue in fiscal year (FY) 2010, and are leveraged in the enclosed project plan. These ongoing initiatives include a Lean Six Sigma review of the general licensing process; aging research and gap assessments; participation with the Electric Power Research Institute and the U.S. Department of Energy in the Extended Storage Collaboration Program; engaging stakeholders and interested parties; and implementing various research activities that support emergent issues on fuel cladding integrity, potential degradation of cask components, criticality safety, and transportation risk.

Upon Commission approval, the staff plans to implement major elements of the project plan (i.e., initiatives that are not already underway) in FY 2011 and FY 2012. These activities include a comprehensive review of the inspection and enforcement programs, gap assessments to identify research and assessment needs in the safety, security, and environmental arenas, and interactions with international counterparts to compare regulatory frameworks and share research. In summary, the staff expects to achieve several outcomes in FY 2011 and FY 2012, including revision of internal procedures for licensing, inspection, and enforcement to improve efficiency, and completion of (or significant progress on) several gap assessments for extended storage and transportation.

It is also important that current and future rulemakings are informed to the extent practical by relevant findings generated from the gap assessments. The staff will coordinate the safety, security and environmental gap assessments with current and future rulemakings that are related to those areas, such as the rulemaking on security enhancements for independent spent fuel storage installations. This coordination could result in adjustments to rulemaking or extended storage and transportation gap assessment schedules. The staff will inform the Commission of any proposed changes to planned rulemaking activities as a result of this coordination effort.

The budgeted resources for FY 2010, for initiatives already underway related to the project plan, are 2.0 FTE and \$1.15M. Projected resources required to implement this plan in FY 2011 will be approximately 21 FTE and \$3.4M. Resources for the FY 2011 project plan activities are included in the NMSS-lead, Spent Fuel Storage and Transportation business line, or are requested on the FY 2011 Shortfall Request. The staff will prioritize and reallocate FY 2011

resources among the offices, as necessary. Projected resources required to implement the plan in FY2012 are pre-decisional and discussed separately in Enclosure 2 (Official Use Only).

SECY, please track.

Enclosures:

1. Project Plan for the Extended Storage and Transportation Regulatory Program Review
2. Official Use Only - Projected Resources for the Extended Storage and Transportation Program Review

cc w/encl: SECY
OGC
OCA
OPA
CFO

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| OFFICE | NMSS:SFST | NMSS:SFST | RES | NSIR | FSME | NRR | RI | RII |
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| NAME | MWaters | VOrdaz | CLui for BSheron | JWiggins | CCarpenter for CMiller | ELeeds | JKinneman for SCollins | LPlisco for LReyes |
| DATE | 05/17/2010 | 05/19/2010 | 05/28/2010 | 06/01/2010 | 05/26/2010 | 05/28/2010 | 05/27/2010 | 05/27/2010 |
| OFFICE | RIII | RIV | OE | NRO | OIP | OCFO | Tech Editor | OGC |
| NAME | CPederson for MSatorius | KKennedy for ECollins | RZimmerman | CAder for MJohnson | SMoore for MDoane | GPeterson | QTE | EBowdenBerry for MYoung |
| DATE | 05/26/2010 | 05/26/2010 | 05/26/2010 | 05/27/2010 | 05/27/2010 | 06/02/2010 | 05/24/2010 | 05/27/2010 |
| OFFICE | NMSS | EDO | | | | | | |
| NAME | CHaney | RBorchardt (MWeber for) | | | | | | |
| DATE | 06/10/2010 | 06/15/2010 | | | | | | |

**Project Plan for the
Extended Storage and Transportation
Regulatory Program Review**

- Revision 0 -

- June 2010 -

Enclosure 1

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ACRONYMS

| | |
|-----------------------|---|
| CFR | <i>Code of Federal Regulations</i> |
| DOE | U.S. Department of Energy |
| DOT | U.S. Department of Transportation |
| EA | environmental assessment |
| EIS | environmental impact statement |
| EPRI | Electric Power Research Institute |
| ESCP | Extended Storage Collaboration Program |
| EST | extended storage and transportation |
| FSME | Office of Federal and State Materials and Environmental Management Programs |
| FTE | full-time equivalent |
| FY | fiscal year |
| GEIS | generic environmental impact statement |
| GWd/MTU | gigawatt-days per metric ton uranium |
| HBU | high burnup |
| HLW | high-level waste |
| IAEA | International Atomic Energy Agency |
| ISFSI | independent spent fuel storage installation |
| LSS | Lean Six Sigma |
| MDEP | Multinational Design Evaluation Program |
| MOX | mixed oxide |
| MRS | monitored retrievable storage |
| NEA | Nuclear Energy Agency |
| NEPA | National Environmental Policy Act |
| NMSS | Office of Nuclear Material Safety and Safeguards |
| NRC | U.S. Nuclear Regulatory Commission |
| NRO | Office of New Reactors |
| NRR | Office of Nuclear Reactor Regulation |
| NSIR | Office of Nuclear Security and Incident Response |
| NWPA | Nuclear Waste Policy Act of 1982 |
| OCFO | Office of the Chief Financial Officer |
| OE | Office of Enforcement |
| OECD | Organization for Economic Development |
| OGC | Office of the General Counsel |
| OIP | Office of International Programs |
| OPA | Office of Public Affairs |
| RES | Office of Nuclear Regulatory Research |
| RIDM | "Risk-Informed Decisionmaking for Nuclear Material and Waste Applications" |
| RIPB | risk-informed and performance-based |
| SA | security assessment |
| SFP | spent fuel pool |
| SFST | spent fuel storage and transportation |
| SNF | spent nuclear fuel |
| SRM | staff requirements memorandum |
| SSC | structure, system, and component |
| UO₂ | uranium dioxide |

Executive Summary

In Staff Requirements Memorandum (SRM)-COMDEK-09-0001, "Revisiting the Paradigm for Spent Fuel Storage and Transportation," dated February 18, 2010, the Commission directed the staff of the Nuclear Regulatory Commission (NRC) 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 (SNF) for extended periods beyond 120 years. The staff believes that the current regulatory framework can be enhanced with additional research, analyses, guidance, and rule changes, to ensure the safety and security of extended storage and transportation (EST) of spent fuel. This project plan focuses on gap assessments and the additional research, data, technical analyses, guidance development, and rule changes that may be needed to implement appropriate enhancements to the NRC's regulatory programs for SNF storage and transportation. This project plan does not govern extended wet storage of SNF in spent fuel pools. The staff will address extended reactor operations, including continued functionality of spent fuel pools, in a separate effort.

In SRM-COMDEK-09-0001, the Commission requested that the staff develop a project plan for a thorough regulatory review of EST. The Commission directed that the project plan contain objectives, plans, potential policy issues, projected schedules, performance measures, and projected resource requirements. This project plan is the staff's response to the Commission's direction. The figure below provides an overview of the project schedule and Appendix B provides projected schedules for major activities. Under the projected schedules, the staff could complete guidance updates and potential rulemaking activities to improve regulatory processes by fiscal year (FY) 2015. For enhancing the regulatory framework to support EST, the staff could publish a potential Generic Environmental Impact Statement on EST in FY 2016 (if needed), and complete potential EST safety and security rulemaking activities in FY 2020. The staff will provide periodic updates of progress, and keep the Commission informed of any significant changes to the project plan or other relevant issues that impact plan implementation, as warranted.

The project plan has two main goals: (1) identify and implement near-term regulatory improvements to the efficiency and effectiveness of the licensing, inspection, and enforcement programs (within the current technical bases) associated with storage and transportation of SNF, and (2) enhance the technical and regulatory basis of the existing regulatory framework to support EST. Key objectives in meeting the first goal include performing systematic, comprehensive reviews of the licensing, inspection, and enforcement processes and implementing guidance; developing new guidance and rulemaking technical bases for regulatory improvements; and implementing enhanced processes, review guidance and potential rule changes (if needed) within the current technical bases for storage and transportation.

For the second goal, the staff will evaluate and enhance the technical and regulatory bases in the safety, security, and environmental areas for the safe, secure storage and transportation of SNF for extended periods. Key objectives in meeting this goal include performing regulatory gap assessments and technical reviews; implementing additional research and technical assessments; revising and/or developing guidance and regulatory bases; and implementing guidance and potential rule changes to support EST. Completion of the latter objectives will depend in part on the additional research and technical assessments identified by the gap assessments. In addition, the staff will coordinate the safety, security and environmental gap

Extended Storage and Transportation Regulatory Program Review

1.0 Project Overview

This project plan describes the staff's plans to review the adequacy of the existing spent nuclear fuel (SNF) storage and transportation regulatory framework for extended storage and transportation of SNF. The first goal is to identify and implement regulatory improvements for the efficiency and effectiveness of licensing, inspection, and enforcement programs (within the current technical bases) associated with the storage and transportation of SNF. The second goal is to enhance the technical and regulatory basis of the existing regulatory framework to support extended storage and transportation (EST). The staff believes that the current regulatory framework can be enhanced with additional research, analyses, guidance, and rule changes, to ensure the safety and security of EST. This plan will initiate gap assessments to identify the additional research, data, technical analyses, guidance development, and rule changes that could be needed to bolster the technical and regulatory basis for EST. Gap assessments generically refer to the identification of technical and regulatory differences between the current, established framework, and that which may be needed to develop an enhanced, future EST framework. This project plan does not govern extended wet storage of SNF in spent fuel pools (SFPs). The staff will address extended reactor operations, including continued functionality of SFPs, in a separate effort (see Section 3.1).

This project plan has been developed by the Office of Nuclear Material Safety and Safeguards (NMSS) in coordination with the NRC Regions and the Offices of Nuclear Regulatory Research (RES), Nuclear Reactor Regulation (NRR), Nuclear Security and Incident Response (NSIR), Federal and State Materials and Environmental Management Programs (FSME), New Reactors (NRO), International Programs (OIP), General Counsel (OGC), Enforcement (OE), and the Chief Financial Officer (OCFO).

1.1 Existing Regulatory Framework

The existing regulatory framework for SNF transport, specified in Title 10 of the Code of Federal Regulations (10 CFR) Part 71, "Packaging and Transportation of Radioactive Material," has been effectively demonstrated through significant operational experience over a period of more than 40 years. Similarly, the existing regulatory framework for SNF storage, specified in 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," has been effectively demonstrated for almost 20 years, with over 1,200 casks loaded at 55 independent spent fuel storage installations (ISFSIs) in the United States. The current regulatory framework supports at least the first 60 years of dry cask storage (i.e., a 20-year initial licensing term, followed by a 40-year license renewal). ISFSI licensees seeking to renew beyond the first 20 years of cask service are required to have an appropriate aging management program that considers the effects of aging on systems, structures, and components (SSCs).¹ Combined with a 60-year operating term for reactor spent fuel pools (SFPs) (i.e., a 40-year initial reactor licensing term, followed by a 20-year license renewal), a regulatory framework for safe and secure spent nuclear fuel management exists for up to 120 years.

¹ The aging management requirement and 40-year license renewal term are being codified in a final rule package that is currently under Commission consideration (SECY-10-0056; ML100710052).

For most (if not all) reactor sites, the SFPs do not have sufficient capacity to hold all the spent fuel generated during 60 years of potential operation under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." Therefore, most reactor licensees will employ dry cask storage under 10 CFR Part 72, well before 60 years of potential reactor operation. Most licensees will need to seek multiple dry cask storage license renewals (i.e., combined 10 CFR Part 72 storage terms beyond 60 years) to reach a total of 120 years of onsite spent fuel management (SFP and casks) if needed. A general regulatory framework exists for multiple storage license renewals with aging management. However, licensees will need to provide appropriate technical bases for identifying and addressing aging-related effects, and develop specific aging management plans to justify extended operations of ISFSIs under multiple renewed license terms. This project plan addresses, in part, the technical and regulatory basis that may be needed by NRC to effectively license and regulate extended periods of spent fuel management (up to and beyond 120 years) through multiple dry cask license renewals.²

The regulatory frameworks for both storage and transportation are supported by well-developed regulatory guidance; voluntary domestic and international consensus standards; research and analytical studies, and processes for implementing licensing reviews, inspection programs, and enforcement oversight. These items, along with the regulatory requirements, form the overall current regulatory framework for storage and transportation.

1.2 Summary of Regulatory Review Approach

This project plan identifies objectives, plans, potential policy issues, projected schedules, performance measures, and projected resource requirements. Section 2 describes plans for near-term regulatory process improvements and enhancements, which include leveraging initiatives that are already underway. The staff expects these enhancements to support interim storage and transportation within the current regulatory bases, and also be applicable to the development of future regulatory bases for EST.

Section 3 describes the staff's plans to conduct an in-depth review assessing the adequacy of the current regulatory framework to support EST. Overall, this review will focus on three key regulatory program areas: safety, security, and the environment (i.e., consistent with the National Environmental Policy Act). In each area, the regulatory review is divided into four phases: (1) regulatory gap assessments and analyses, (2) follow-on research and technical analyses, (3) development and extension of guidance and regulatory technical bases, and (4) implementation of potential rule changes.

² This discussion should not be confused with the analysis in the Commission's Waste Confidence Decision. The technical bases discussed here are the designs, data, analyses, and operating and monitoring procedures that support the issuance of certificates and licenses for specific dry cask storage systems, and that provide reasonable assurance that the waste will be stored safely for the term of the license or certificate. The Commission's Waste Confidence Decision is a generic action where the Commission found reasonable assurance that the waste can be stored safely and with minimal environmental impacts until a repository becomes available. The Waste Confidence Decision does not license or certify any dry cask storage system; the additional research, assessments, guidance, and regulations discussed in this plan provide the regulatory framework that could be necessary to license or certify a dry cask storage system for extended operations. Nothing in this paper challenges the bases discussed in the existing Waste Confidence Decision or rule, the draft Waste Confidence rulemaking published for comment, or the final version of that rulemaking prepared by the staff in response to comments that is currently before the Commission (SECY-09-0090; ML091660274).

Several of these review activities require a finite timeframe for analytical purposes (e.g., extrapolating research data, performing risk or environmental assessments, and developing aging management guidelines). Therefore, the staff has preliminarily selected an analytical timeframe of 300 years as the scope of the EST regulatory program review. The staff's planned research and analyses could, theoretically, identify potential timeframes within this period that could require significant aging management mitigation actions, such as extensive cask maintenance or repackaging of SNF into new systems. In addition, external initiatives such as the industry's Extended Storage Collaboration Program (ESCP) may look generically at aging phenomena and potential times-to-failure for various cask components and SNF. Therefore, the staff may revise the project plan, as appropriate, to consider other analytical timeframes based on insights gained from external research, analyses, or industry plans.

Section 4 of this project plan addresses cross-cutting strategies that will be applied, as appropriate, to all activities discussed in this project plan. The strategies include: (1) implementing risk-informed and performance-based (RIPB) enhancements, (2) promoting domestic standards development, (3) promoting international cooperation, (4) exploring incentives for industry adoption of state-of-the-art technologies, and (5) ensuring opportunities for stakeholder participation.

Section 5 of this project plan discusses management of the project plan, including schedules, resources, and performance measures. The schedule and objectives for the latter phases of this project plan depend on several factors including the outcomes of the earlier phases and stakeholder participation. Therefore, the project plan will be evaluated for any necessary revisions near the end of the initial activities such as the technical gap assessments and comprehensive licensing and inspection process reviews. The staff will provide updates of progress and any significant changes to the project plan at the annual NMSS Program Briefs for the Commission.

The scope of the project plan includes the storage and transportation activities listed in Table 1-1, that are currently within NRC's regulatory oversight. There is one licensed wet-storage facility at GE Morris, which has a unique licensing basis under 10 CFR Part 72. To address any future challenges related to GE Morris, the staff will leverage the aging research associated with reactor SFP life extensions. However, this project plan does not specifically govern research program activities for extended storage of SNF in reactor SFPs under 10 CFR Part 50. RES and NRR have initiated several efforts in support of the continued safe operation of SFPs. These activities will be coordinated with the dry cask storage and transportation activities described in this project plan. Finally, this project plan does not address research-reactor SNF, production-reactor SNF, naval-reactor SNF, defense high-level waste (HLW), or potential reprocessed HLW. The NRC does not typically regulate (or have not regulated yet) the dry storage of these forms under 10 CFR Part 72, and staff would need additional data regarding the characteristics of such forms. However, the staff expects that most regulatory framework enhancements would be generically applicable to these waste forms (or could be reasonably extended with additional data), if the need arose for NRC regulation.

Table 1-1. Scope of Storage and Transportation Activities

| Functional Areas | Types |
|------------------|--|
| Contents | <ul style="list-style-type: none"> ▪ Commercial UO₂ Fuel ▪ Mixed Oxide Fuel ▪ Damaged Fuel ▪ High Temperature Gas Cooled Fuel (Fort St. Vrain only) ▪ Greater-than-Class-C Waste |
| Cask Designs | <ul style="list-style-type: none"> ▪ Bolted-Closure ▪ Welded Canister—Overpack (vertical and modular) ▪ Welded Canister—Underground Silo ▪ Modular Dry Vault (Fort St. Vrain only) ▪ Wet Storage (GE Morris only) |
| Uses | <ul style="list-style-type: none"> ▪ Storage-Only Cask ▪ Transportation-Only Package ▪ Dual-Purpose Cask (storage and transportation) |
| Sites | <ul style="list-style-type: none"> ▪ Reactor Sites ▪ Decommissioned Reactor Sites ▪ Away from Reactor sites ▪ Monitored Retrievable Storage Sites (NWPA option) |
| Licensing | <ul style="list-style-type: none"> ▪ Part 72 Site-Specific Storage License ▪ Part 72 General License and Storage Cask Design Certification ▪ Part 71 General License and Transport Package Certification |

2.0 Regulatory Process Improvement Review

The goal of the regulatory process improvement review is to identify and implement near-term efficiency and effectiveness enhancements within the current regulatory technical bases and framework. This review will address two key areas: (1) licensing and (2) inspection and enforcement. The staff plans to perform systematic, comprehensive reviews and evaluations of these key areas, as they exist today. Appendix B provides schedules for major activities of the regulatory process improvement reviews. The strategies and objectives described in Section 4 will also be implemented as part of the process improvement reviews, as applicable. As a result of these activities, the following projected outcomes are expected for the regulatory process improvement reviews in fiscal year (FY) 2011 and FY 2012:

- Identification of enhancements for storage cask certification (including rulemaking approval), general license, and site-specific license review processes
- Identification of enhancements for SNF package certification review processes (including storage and transportation compatibility)
- Identification of enhancements for inspection and enforcement processes (including integration of inspection & licensing)
- Enhanced internal procedures and guidance for licensing reviews

2.1 Licensing Review

Key Objectives

- Perform a comprehensive Lean Six Sigma (LSS) review of the general license and cask certification process, including the rulemaking process that supports cask certification.
- Perform a comprehensive review of site-specific storage license processes.
- Perform a comprehensive review of SNF transportation certification processes.
- Update guidance and procedures with process enhancements identified through the reviews.
- Revise 10 CFR Parts 71 and 72 to facilitate improved licensing processes, as appropriate.
- Revise 10 CFR Part 73 to facilitate improved security licensing processes, as appropriate.

Summary

The staff will perform comprehensive reviews and evaluations of the licensing review program within the current regulatory technical bases. These reviews will consider the past two decades of experience with licensing and oversight of dry cask storage. The staff will systematically examine relevant rules, guidance, standards, assessments, and internal processes to identify near-term efficiency and effectiveness enhancements. The staff has targeted completion of procedure and guidance updates in FY 2013 and potential rule changes in FY 2015. As part of the licensing reviews, the staff will examine the rulemaking process currently used to certify casks, and the integration of 10 CFR Part 71 and Part 72 requirements and review processes. These reviews may identify potential policy issues, as further described in Appendix A.

Discussion

The staff will systematically examine the general license and certification review process (including rulemaking aspects), the site-specific storage facility review process (excluding hearing aspects), and the transportation certification process. Currently, the staff is applying the LSS method to the general license process, to review the process NRC uses to issue certificates of compliance for cask designs (including the rulemaking process), and the ways in which the NRC exercises its oversight of 10 CFR Part 50 licensees invoking the general license granted to them in 10 CFR 72.210, "General Licensed Issued." The LSS effort will examine improvements to the general license process under 10 CFR Part 72 by enhancing the efficiency and effectiveness of efforts required to conduct safety reviews, and by reducing the time to process applications for storage certificates of compliance, as appropriate. Similar systematic, comprehensive reviews will be performed for other 10 CFR Part 71 and Part 72 site-specific licensing processes. In addition, the staff will be revising several division-level procedures and interim staff guidance documents to increase efficiency and improve knowledge management. Subsequent activities will include updates to license review guidance and processes, and potential implementation of 10 CFR Part 71 and Part 72 rule changes to incorporate enhancements identified as part of the review. The staff will consider soliciting input specifically on any resource impacts as part of any proposed rules and address the feedback in developing

the final rule implementation schedules, as appropriate. These rule changes would also require development of an environmental assessment (EA) or environmental impact statement (EIS), as appropriate.

Review of Certification by Rulemaking

The Nuclear Waste Policy Act of 1982 (NWSA) directs the NRC to establish procedures for approval of SNF storage casks. The NWSA (Sections 133 and 218) mandates the Commission to "by rule, establish procedures for the licensing of any technology approved by the Commission under section 219(a) for use at the site of any civilian nuclear power reactor" and "without, to the maximum extent practical, the need for additional site specific approvals by the Commission." To satisfy this law, the NRC granted a general license to all 10 CFR Part 50 licensees to allow use of casks certified by NRC. The NRC uses the rulemaking process to approve new cask designs and amendments, and to add them to the list of certified casks in 10 CFR Part 72. This is the mechanism that affords stakeholders the opportunity to comment on final cask approval after NRC's safety review. The rulemaking process requires significant resources and adds several months to the approval process. The LSS effort may identify efficiencies to be gained in the rulemaking process. Additionally, as part of the comprehensive review of the general licensing process, the staff will (1) assess the past experience and value of cask rulemakings, (2) assess specific regulations and laws that govern the cask rulemaking process, and (3) identify recommendations for streamlining the rulemaking process.

Review of 10 CFR Part 71 and 72 Compatibility of SNF Cask Approvals

SNF storage regulations in 10 CFR Part 72 specify requirements for maintaining cladding integrity, criticality safety, and offsite radiation dose limits for normal and off-normal conditions, and credible design-basis accidents specified by the licensee. SNF transport regulations in 10 CFR Part 71 specify requirements for maintaining configuration of contents, criticality safety, radionuclide release limits, and surface dose limits for normal and hypothetical accident conditions prescribed in the regulations. While there are differences between 10 CFR Part 71 and Part 72 requirements, the major cask components (such as inner, welded SNF canisters) of large-capacity SNF transportation packages and SNF storage casks are often the same design. These casks are referred to as "dual-purpose" casks. Applicants often request storage approval of these designs under 10 CFR Part 72, well before seeking transportation approval under 10 CFR Part 71, in order to accommodate more immediate needs to maintain full-core offload capability at reactor sites. Given this current licensing practice, there is no regulatory assurance that loaded and sealed storage casks (including currently-loaded and future casks loaded with high-burnup [HBU] SNF) will later meet all transportation requirements under 10 CFR Part 71. Therefore, some storage casks may later need to be opened to allow repackaging of the fuel into acceptable transportation packages.

The staff will evaluate the compatibility of 10 CFR Part 71 and Part 72 requirements to identify (1) areas of overlap where the requirements are substantially similar, (2) areas where the performance requirements are significantly different, (3) specific regulations that must be met for transportation for which there is no similar storage regulation, and (4) recommendations for improving the compatibility and efficiency of the 10 CFR Part 71 and Part 72 review processes. The staff will also evaluate the different types of currently-authorized dry cask storage systems to identify any potential unique compatibility issues. This assessment will also consider potential integration of the storage and transportation safety reviews conducted under 10 CFR

Part 71 and Part 72. This could enhance the effectiveness and efficiency by eliminating any unnecessary duplication of technical reviews that currently occur within the two different licensing actions for the same system.

ISFSI Security Rulemaking

As part of the ongoing ISFSI security rulemaking, the staff is evaluating the structure of the NRC's security plan review processes and whether the process for general license ISFSIs should more closely follow the current process for specific license ISFSIs, as a near term process improvement. The rulemaking effort is discussed in greater detail in Section 3.2.

2.2 Inspection and Enforcement Review

Key Objectives

- Perform a comprehensive review of the ISFSI operation and cask vendor inspection program and enforcement policies, and associated rules, guidance, and procedures.
- Update guidance and procedures with process enhancements identified through the reviews, including RIPB improvements and improved integration with licensing programs.
- Revise the Enforcement Policy, if necessary, to implement potential changes in the enforcement process.
- ~~Revise 10-CFR Parts 71, 72, and 73 to implement potential rule changes for improved inspection and enforcement processes, as appropriate.~~

Summary

The staff will perform comprehensive reviews and evaluations of the inspection and enforcement programs within the current regulatory program. These reviews will consider the past two decades of licensing and oversight experience of dry cask storage and transportation. The staff will systematically examine relevant rules, standards, guidance, procedures, and internal processes used to conduct inspections and enforcement of SNF storage and transportation, and identify near-term efficiency and effectiveness enhancements. The staff will also identify areas where licensing reviews and inspection can be integrated to be more effective in a RIPB manner. Concurrently with the inspection process reviews, the staff is planning to develop guidance on inspecting aging management programs at ISFSIs with renewed license terms. The staff has targeted completion of procedure and guidance updates in FY 2013 and potential rule changes in FY 2015.

Discussion

The staff will systematically examine the NRC inspection and enforcement oversight processes and associated procedures for fabricators, certificate holders, and licensees for storage and transportation activities. The goal of this review is to identify process improvements within the current technical and regulatory basis and oversight regulatory structure that can be implemented in the near term. The staff will also review current NRC inspection guidance to assess the efficacy of the inspection and enforcement of aging management plans that are

associated with the 40 year license renewals that are expected under 10 CFR Part 72. Further, the staff's review will assess if changes are necessary to key regulatory and licensing documents such as the inspection manual and the enforcement policy. This will include examination of how NRC inspects and enforces licensee change authority and quality assurance. Finally, the staff will identify areas where licensing review findings can be integrated into the inspection process, and where inspection findings can provide feedback in future licensing actions. The staff will review, at a minimum, areas for integration between licensing and inspection and ways to leverage the inspection program to improve the quality of licensing applications for both storage and transportation activities. Concurrently with the inspection process reviews, the staff is planning to develop guidance on inspecting aging management programs at ISFSIs with renewed license terms.

3.0 Extended Storage and Transportation Program Review

The objective of the EST program review is to bolster the technical bases and enhance the NRC's regulatory framework to support EST. This broad-scope review is divided into three key regulatory areas: safety, security, and environmental. In each area, the regulatory review is divided into four phases: (Phase 1) regulatory gap assessments and analyses; (Phase 2) additional research and technical analyses; (Phase 3) development and/or extension of guidance and regulatory technical bases; and (Phase 4) implementation of potential rule changes. The four review phases will be performed in a concurrent and/or staggered manner for some activities, to assure appropriate coordination and integration among the key regulatory areas. This section describes the staff's objectives and bases for review in each area. Appendix B provides schedules for major activities of the EST program review. The review strategies and objectives described in Section 4 will also be implemented as part of the EST program review, as applicable. As a result of these activities, the following projected outcomes are expected for the EST program review in FY 2011 and FY 2012:

- Safety gap assessment reports for EST regulatory issues
- Environmental gap assessment report for EST regulatory issues

Because the performance of storage and transportation casks should consider the interface between security and safety, and associated common technical issues, the staff will coordinate the results of respective gap assessments and subsequent research before any enhancements to the safety and security regulations are made for EST. This coordination will improve the compatibility and effectiveness of any enhancements to the security and safety regulatory frameworks. Also, it is important that current and future rulemakings are informed to the extent practical by all relevant findings generated from the Phase 1 gap assessments. The staff will coordinate the safety, security and environmental gap assessments with any current and future rulemakings that are related to those areas. This coordination could result in adjustment to rulemaking or EST gap assessment schedules. Additionally, the staff will consider soliciting input specifically on any resource impacts, as part of any proposed rules and address the feedback in developing the final rule implementation schedules, as appropriate. The staff will inform the Commission of proposed changes to planned rulemaking activities as a result of these coordination efforts.

3.1 Safety Program Review

Key Objectives

- Perform gap assessment for EST technical and regulatory issues.
- Perform gap assessment of financial assurance and qualification requirements for EST scenarios (safety and security).
- Perform short-term research and testing of materials for issues and phenomena identified by gap assessment.
- Perform research and analyses of burnup credit for criticality safety (ongoing effort).
- Perform research on cladding integrity of HBU SNF (ongoing effort).
- Participate in an industry and government Extended Storage Collaboration Program (ESCP) and independently observe a future long-term cask demonstration program.
- Update licensing and inspection guidance for EST.
- Develop regulatory bases and revise 10 CFR Parts 71 and 72 for EST, as appropriate.

Summary

The goals of the safety program review are to assess the adequacy of the current safety framework and to enhance the technical bases, as necessary, to support regulation of EST. In Phase 1, the staff will prepare gap assessments to identify technical safety issues and regulatory framework issues that may impact EST, with a focus on extended aging management issues. The staff will also examine financial assurance and qualification requirements, to evaluate potential issues with the ability of licensees to reasonably maintain safe and secure operation and decommissioning of SNF storage facilities for EST periods. In Phase 2, focused research will be implemented as a result of the technical gap assessments for extended storage. Additionally, NRC will encourage and independently participate in an Extended Storage Collaboration Program (ESCP) that is an effort led by the Electric Power Research Institute (EPRI) to demonstrate safety of SNF storage casks (i.e., fuel cladding and cask components) over extended periods. In Phase 3, the staff will update guidance and regulatory bases based on the data and insights obtained from gap assessments and research studies. In Phase 4, staff will implement any necessary rule changes to 10 CFR Part 71 and Part 72 to support EST. As part of these overall activities, the staff will examine EST cladding integrity and financial issues that may result in potential policy issues, which are further characterized in Appendix A.

Discussion

Under the current regulatory framework, a safety basis has been demonstrated by licensees for safe operation of SNF storage casks for 60 years (i.e., an initial 20-year license followed by a 40-year renewal period with an aging management program). SNF storage cask facilities are required to have an active aging management plan for license terms beyond the initial 20 years

of cask service. The 60-year safety basis with aging management is supported by the results of the U.S. Department of Energy (DOE) Cask Demonstration Program that examined a cask loaded with lower burnup fuel (approximately 30 GWd/MTU). Following 15 years of storage, the cask internals and fuel did not show any significant degradation. The data from this study can be extrapolated to maintain a licensing safety finding that low-burnup SNF can be safely stored in a dry storage mode for at least 60 years with an appropriate aging management plan. The evidence also indicates that dry storage of SNF can likely be maintained up to 100 years without the need for significant aging management mitigation actions; however, licensees have not developed a safety basis and the NRC has not reviewed such a request for extended periods of storage.

While a spent fuel cask system maintains an independent confinement system, the spent fuel cladding is credited as the primary fission product barrier during interim storage and transportation. However, industry has limited operational experience with the transport of HBU fuel, and there is little operational or experimental data regarding HBU fuel behavior during storage and transportation. This gap in data should be resolved because industry intends to seal HBU fuel in dry storage casks under 10 CFR Part 72 and later transport it under 10 CFR Part 71, without reopening the cask. This may also be an important consideration for future ISFSI sites at decommissioned reactors that may request to load HBU fuel in storage, and later decommission fuel-handling facilities (e.g., spent fuel pools).

The scope of data varies with potential long-term degradation phenomena of cask SSCs, such as concrete, steel, resins, seal materials, and unique basket materials. These materials and structures will be credited with providing adequate structural integrity, confinement of SNF, criticality safety, shielding, and heat removal for SNF during EST. These SSCs will need to continue to perform their safety functions for normal conditions, accidents, and natural phenomena over EST timeframes.

Gap Assessments and Short-Term Research for Dry Cask-EST

During the first phase of the safety review, the staff will perform gap assessments to identify technical issues that require research and analyses for EST. This will involve revisiting the conclusions of previous evaluations underlying the current technical and regulatory basis to identify information and technical research needed to enhance the framework for effective regulation of EST scenarios. The staff expects that the outcome of the gap assessments will include a prioritized list of information needs and a recommendation of the most effective means (e.g., confirmatory testing) to obtain the information.

The gap assessments should identify phenomena warranting further investigation through analyses and short-term research. One phenomena of consideration will likely be the aging effects on cladding integrity in various combinations of extended wet storage and dry storage modes. Through frequent communication and coordination, the staff will also maintain awareness of industry, Department of Energy (DOE), and Electric Power Research Institute (EPRI) plans to conduct research to justify EST safety. The staff will independently observe and review research data that is provided by these groups.

As part of this coordination, the staff is participating in an ESCP led by EPRI. The program group includes EPRI, DOE, the Nuclear Waste Technical Review Board, cask vendors, and utilities. The group also intends to establish a long-term cask demonstration program to monitor

and evaluate aging effects. As an independent regulatory agency, the NRC will independently observe and review test plans and research data that is developed by the program group. The long-term cask demonstration program could provide confirmation and validation of the extrapolations that were made from short-term data, and could identify any previously unrevealed aging effects detrimental to the performance of dry cask storage systems during extended periods. This would ensure that appropriate monitoring, mitigation, corrective actions, and other regulatory actions are implemented during extended storage operations. An understanding of aging mechanisms (e.g., concrete degradation or corrosion of materials) will allow NRC to formulate requirements and guidance for time-limited aging analyses and aging management programs that will be needed from licensees to allow EST operations. The long-term cask demonstration program may also identify potential aging issues (in addition to analytic predictions) inside the cask system that could require physical monitoring of internal components and fuel during extended storage. The staff notes it may not be able to rely upon DOE for contractor support to assist in independent NRC observations and analyses of the demonstration program results, and would likely need to obtain support from other conflict-free contractor entities, as appropriate.

In addition to conducting the gap assessments and follow-on short-term research, and participating in the ESCP, the staff will leverage and integrate initiatives already underway (before the issuance of SRM-COMDEK-09-0001) to address emergent issues within the current licensing basis. These ongoing initiatives include HBU cladding integrity research, burnup credit criticality safety research, transportation criticality risk assessments, and various other transportation risk assessments. Finally, the staff will also seek areas for international cooperation, as appropriate, for sharing and coordinating EST research activities of common interest (see Section 4.3).

Gap Assessment for Financial Qualification and Assurance

The regulation in 10 CFR Part 72 provides two types of ISFSI licenses: specific and general. Under the provisions of 10 CFR 72.22, a specific-license applicant must show it possesses or has reasonable assurance of obtaining funds to cover the estimated costs of constructing, operating, and decommissioning the ISFSI. Financial qualification typically refers to the ability to fund construction and operation. Financial assurance typically refers to the assurance that funds will be available when needed for decommissioning. The financial assurance requirements for an ISFSI that are required as part of a decommissioning plan included with the specific-license application are provided in 10 CFR 72.30.

There are no financial qualification requirements for ISFSIs operating under the general license, as these licensees submit information regarding financial requirements for spent fuel management under 10 CFR 50.54(bb). The general licensees must show how they intend to manage and provide funding for the management of all irradiated fuel on the reactor site, including the SNF stored in the ISFSI. The spent fuel management programs submitted under 10 CFR 50.54(bb) assume the fuel will be shipped to DOE at some point in the future. Under 10 CFR 72.30(c)(5), the reactor licensee may use the methods of 10 CFR 50.75 to provide financial assurance for decommissioning the ISFSI.

The current regulatory structure for financial assurance and qualification for ISFSI licenses is founded on the premise that dry cask storage is an interim operation, and that DOE would provide for long-term spent fuel management, including bearing the costs of shipping the spent

fuel from reactor sites to the permanent repository. Therefore, it was not incumbent upon ISFSI licensees to demonstrate financial assurance for these activities over an extended period of time. The future national policy on spent fuel disposition is uncertain. It is unclear whether judicial settlements, legislative actions, or other types of agreements will result in DOE, for example, funding the costs associated with ISFSI operations for extended onsite storage of fuel. In the interim, the staff may need to consider how the licensees will finance operational expenses for extended storage times. These expenses could include extended storage operations, security personnel, monitoring, possible inspection and repackaging operations, and decommissioning with inflated costs in EST scenarios. The staff will conduct a financial gap assessment for EST. To ensure potential extended safety and security costs are considered, the financial gap assessment will begin after safety and security gap assessments have progressed to provide insights on future costs.

Life Extension Efforts for Reactor Spent Fuel Pools

As part of the dry storage gap assessments, staff will generically consider high-level functional and compatibility needs of SFPs to support extended periods of dry cask storage operations and transportation. NMSS staff will coordinate these efforts with NRR and RES to provide insights on future research needs for reactor SFPs under 10 CFR Part 50 life extension efforts.

For the foreseeable future, the staff anticipates dry cask storage will be the alternative preferred by industry for providing additional storage capacity at operating and new reactors and for providing ultimate spent fuel management needs at decommissioned sites or at away-from-reactor sites. The 10 CFR Part 50 reactor SFPs will continue to play an integral role in storing and handling spent fuel at reactors during renewed license terms and eventual decommissioning. Operational SFPs are required to store spent fuel assemblies safely until sufficient radioactive decay has occurred to allow loading in dry storage casks and transportation packages. Therefore, the staff expects reactor SFPs will need to be operational beyond 60 years (through Part 50 licensing actions), to support extended reactor lives, storage, transportation needs, and decommissioning.

In separate activities, RES and NRR have initiated several efforts in support of the continued safe operation of SFPs. The first and broader activity is to evaluate the feasibility of reactor license renewal beyond 60 years. This activity includes evaluation of aging management issues associated with extending the operating life of SFPs and fuel handling facilities beyond 60 years (through 10 CFR Part 50 licensing actions). This activity will also consider concrete degradation mechanisms, which may inform concrete aging issues with concrete dry cask storage technologies. In a second activity, NRR and RES are initiating near-term efforts to examine degradation issues with SFP neutron absorbers, and to evaluate methods for monitoring material condition and mitigating degradation. This project plan does not govern these specific activities.

3.2 Security Program Review

Key Objectives

- Leverage activities with the ongoing transportation and storage security rulemakings.
- Perform gap assessment of the regulations, guidance, and processes related to SNF storage security.
- Perform gap assessment of the regulations, guidance, and processes related to SNF transportation security.
- Conduct research and/or assessments based on the outcome of the gap assessments.
- Revise 10 CFR Part 73, "Physical Protection of Plants and Materials" and 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material," based on the outcome of gap assessment and research, as appropriate.

Summary

The goal of the security program review is to evaluate the adequacy of the security framework and to expand the bases, as necessary, to support regulation of EST. The security review will leverage results ongoing storage and transportation security rulemaking activities. In Phase 1, the staff will implement regulatory gap assessments regarding technical security issues and regulatory framework issues that may impact EST. In Phase 2, security-related research and analyses will be implemented as a result of the gap assessments. In Phase 3, the staff will update security guidance and regulatory bases based on the data and insights obtained from gap assessments and research studies. In Phase 4, the staff will implement any necessary rule changes to 10 CFR Parts 73 and 74 to support EST.

Discussion

The NRC requires a high assurance of the common defense and security for facilities and licensees storing and/or transporting SNF and high-level radioactive waste. After the events of September 11, 2001, under Commission direction, the staff reviewed the existing requirements for SNF storage and transportation, and determined that Orders were necessary to put further enhancements in place. Following the issuance of the Orders, the staff conducted security assessments (SAs) to evaluate a number of representative storage cask and transportation package designs against a variety of land-based threats and a deliberate plane crash. The results of these security assessments showed that no additional immediate enhancements were necessary for common defense and security and the protection of the public health and safety, and the environment.

SECY-06-0045, "Results of Implementation of the Decisionmaking Framework for Materials and Research and Test Reactor Security Assessments," dated March 1, 2006 (ML060340420), documented the results of the SAs. This paper describes a process to reinitiate the SAs, should the need arise in the future. The process includes seven different criteria that would cause the staff to apply the SA framework. Under this project plan, the staff will assess these criteria in light of the potential changes to the current regulatory framework to determine whether

additional SAs are necessary. The acceptance criteria for the storage security assessments have evolved since SECY-06-0045, with the ISFSI security rulemaking currently underway as directed by SRM-SECY-07-0148, "Independent Spent Fuel Storage Installation Security Requirements for Radiological Sabotage," dated December 18, 2007 (ML073530119). However, the SA process itself (e.g., consequence and attractiveness assessments) is still relevant, and will be applied as needed.

The staff will perform a technical and regulatory gap assessment to identify any issues associated with potential changes in the cask or institutional controls over extended periods. The gap assessment will identify areas of the regulations and guidance documents (e.g., DG-5033, discussed below) that should be updated. Further, the gap assessment will assess whether EST considerations meet any of the criteria in SECY-06-0045 for reinitiating the SA framework.

It is preferred that current security rulemakings are completed, or reach the proposed rule stage, prior to the security gap assessment process. The EST security gap assessment will be based on the new regulations. The staff will also coordinate the safety, security and environmental gap assessments with any current and future security rulemakings that are related to those areas, such as rulemakings for SNF transportation security and SNF storage facility security, the rulemaking to revise the material, control, and accountability (MC&A) requirements in 10 CFR Part 74 for SNF storage facilities, and potential rulemaking impacts on physical security requirements resulting from the material categorization paper (SECY-09-0123; ML092230646) currently before the Commission. Future security rulemakings will be informed to the extent practical by all relevant findings generated from the Phase 1 gap assessments.

Security Gap Assessment for Spent Nuclear Fuel Storage

The current security regulations for ISFSIs are quite complex and pose challenges to both NRC staff and to the regulated industry. This regulatory complexity stems from multiple factors, including the two different types of ISFSI licenses (general and specific licenses) under 10 CFR Part 72, and the varying applicability of regulations based on whether the ISFSI is collocated with an operating power reactor, is collocated with a decommissioning power reactor, or is located away from any power reactors. The nature and characteristics of the threat environment have also evolved significantly over time. In light of this complexity, the orders issued to ISFSI licensees ensure that a consistent overall protective strategy is in place for all ISFSIs.

In SRM-SECY-07-0148, the Commission directed the staff to undertake a rulemaking to update the ISFSI security requirements with three main objectives: (1) apply consistent standards to all types of ISFSI licensees and monitored retrievable storage (MRS) facilities to improve the clarity of the NRC regulations; (2) to establish generically applicable requirements similar to those imposed on ISFSI licensees by the post-9/11 security orders, and (3) to use a RIPB structure in ISFSI and MRS security regulations. In accomplishing these objectives, this rulemaking will incorporate the Commission's directions on several specific policy issues. Further, the staff will develop several regulatory guidance documents to support implementation of this planned rulemaking. In addition, the staff will consider rescinding, relaxing or modifying the ISFSI security orders after the rulemaking is completed, if appropriate. In developing this rulemaking, the staff issued the draft technical basis for public comment and received significant comments from a diverse range of stakeholders. The staff is currently evaluating the issues raised by the

stakeholders and assessing potential options for the rulemaking. The staff may provide a supplemental paper in the near term to inform the Commission of these comments for further consideration.

The staff has contracted with Sandia National Laboratories to support the development of the rule. The first phase of this work will group casks and facilities into families, identify appropriate security scenarios, and estimate additional calculations and modeling that will be necessary to develop the regulatory guidance document. Following NRC review, the second phase of the contract work will include the detailed calculations and modeling, development of the draft proposed guidance document, support of stakeholder meetings and resolution of comments, and development of the final guidance document.

The staff plans to conduct a EST gap assessment for SNF storage security, which will explore technical issues, such as (1) whether the potential degradation of the spent fuel storage cask system will impact cask response to security scenarios, (2) whether the potential degradation of the spent fuel will impact fuel response (and resultant release fractions) to security scenarios, (3) whether the cooling and radioactive decay of the SNF will, at some point, make it necessary to consider diversion as a credible scenario.

As part of this project plan the staff will consider potential integration of EST storage security gap assessments with any research and storage security rulemaking activities at the time of the assessment. At a minimum, the EST gap assessment will leverage the ongoing contract work with Sandia National Laboratory described above. The staff will further leverage the updated threat assessment for ISFSIs that is planned as part of the ISFSI and MRS security rule, to inform revisions to DG-5033, "Security Performance (Adversary) Characteristics for the Design, Development, and Implementation of a Physical Security Program for Spent Nuclear Fuel and High-Level Radioactive Waste Storage Facilities under 10 CFR Part 73," (Safeguards E-Safe Accession No. ES100011507). The staff will also apply the RIPB review strategy, as applicable, to the security of extended storage.

Security Gap Assessment for Spent Nuclear Fuel Transportation

The existing transportation security requirements for SNF have been in place, mostly unchanged, since 1980. The existing security requirements for SNF, primarily found in 10 CFR 73.37, "Requirements for Physical Protection of Irradiated Reactor Fuel in Transit," address the security of SNF transported by road, rail, or sea, and were based on preventing radiological sabotage of the shipment either in situ or by relocation of the SNF to a heavily populated area, before causing the radiological sabotage. Security measures to prevent the diversion of the SNF (i.e., extraction of the plutonium or highly enriched uranium content from the SNF for use in a nuclear device) are not included in 10 CFR 73.37, because of the reliance on the self-protecting capability of the high dose rate and the large weight of a typical power reactor SNF assembly. The staff notes that 10 CFR 73.37 also does not include security requirements for the transport of SNF by air, because 10 CFR 71.88 bans the air transport of plutonium (in the form of SNF).

SECY-09-0162, "Proposed Rule: 10 CFR 73.37 Physical Protection of Irradiated Reactor Fuel in Transit," dated October 31, 2009 (ML092710405) is under Commission review. This proposed rule considers the security concepts imposed by Commission Orders and it also addresses, in part, a petition for rulemaking from the State of Nevada (PRM-73-10) that requests NRC

strengthen the regulations governing the security of SNF shipments against malevolent acts. The rulemaking proposes enhancing security in the areas of preplanning and coordination of a shipment with the States through which it passes; continuous and active monitoring of a shipment; trustworthiness and reliability of personnel associated with a shipment; and provisions for armed escorts along the entire route. The staff will consider rescinding, relaxing or modifying the transportation security orders after the rulemaking is completed, if appropriate.

The NRC transportation security regulations are harmonized with the Convention on Physical Protection of Nuclear Material and its supporting guidance, INFCIRC/225 Revision 4, "Physical Protection of Nuclear Material and Nuclear Facilities," issued June 1999. The NRC has always maintained representatives on the working and technical groups associated with the development and revisions of INFCIRC/225. Currently, the staff is participating with DOE and the U.S. Department of State in the technical group developing Revision 5. The NRC's active participation in INFCIRC/225 development ensures the NRC regulations and guidance are harmonized with those of the international community.

The staff plans to also conduct gap assessments for SNF transportation security to (1) review the current threat assessment for transport, (2) analyze the impact of the potential increase in the number of shipments (considering a potential regionalized storage facility scenario), (3) study the implications of shipping fuel following an extended period of storage, including an analysis of when potential fuel and/or materials degradation begins to impact the cask response to security scenarios, and whether fuel cooling results, at some point, in the introduction of additional credible threat scenarios, and (4) look for RIPB enhancements. These gap assessments will inform the need for additional research and analyses to enhance the transportation security framework for EST. As part of this project plan the staff will consider potential integration of EST transportation security gap assessments with on-going research and transportation security rulemaking activities.

3.3 Environmental Program Review

Key Objectives

- Perform an environmental gap assessment for SNF storage and transportation to identify additional information and assessment needs determine whether there is a need to supplement the existing EISs or to develop a potential generic EIS (GEIS) for streamlining environmental reviews of centralized or regionalized storage applications, and development of other environmental documents to support EST.
- Initiate a public scoping process to identify issues for considering a GEIS for various EST scenarios (if appropriate).
- Issue a GEIS supporting various EST scenarios (if appropriate).
- Issue an EA or EIS supporting rule changes for EST (see Sections 3.1 and 3.2).

Summary

The goal of the environmental program review is to evaluate the adequacy of the current environmental framework, and prepare for environmental reviews of future EST scenarios that

may require NRC regulatory action. Potential scenarios include new cask designs for extended storage, regionalized or centralized away-from-reactor storage facilities, and associated transportation needs. In Phase 1, the staff will perform a scoping assessment of NRC's current collection of EAs or EISs (collectively referred to as NEPA documents) that support spent fuel storage and transportation actions. The scoping will identify potential information gaps that will need to be assessed and then evaluated for future regulatory actions for EST. In Phases 2 and 3, the staff may develop generic environmental review documents (e.g., GEIS) to assess the impacts of extended storage for new types of facilities (e.g., regionalized facilities) and associated transportation needs for EST scenarios. In parallel, guidance and processes could be developed and/or revised to support the development of any new environmental review documents and agency review of applicants' environmental reports. In Phase 4, the staff may develop a final EA or EIS in support of potential changes to regulations related to EST, as discussed in Sections 3.1 and 3.2.

Discussion

The National Environmental Policy Act of 1969 requires Federal agencies, as part of their decision-making process, to consider the environmental impacts of actions under their jurisdiction. The staff will continue to perform environmental reviews, as needed, for the various licensing or regulatory actions within the scope of the storage and transportation regulatory frameworks. Specific-license issuances or renewals for at-reactor or away-from-reactor ISFSIs will continue to require the development of EAs or EISs, addressing potential impacts for at least the term of the license or renewal. Additionally, the staff will continue to perform environmental reviews for storage cask certification under 10 CFR Part 72, which currently involves the rulemaking process.

Environmental Gap Assessments

The staff will perform a gap assessment of environmental needs for different storage and transportation scenarios, in parallel with the regulatory process improvement review and the EST program review. These review activities could result in substantive changes to 10 CFR Parts 71, 72, or 73. Such rule revisions would require the development of an EA or an EIS, depending on the significance and scope of the rule change (i.e., the significance of the proposed Federal action). The staff will develop a prioritized list of information needs to assist in determining the types of environmental analyses needed to support rule changes.

If NRC decides to implement a new licensing program to accommodate an extended storage scenario, the agency would likely need to prepare an EA or EIS (or supplement existing ones) for a rulemaking (depending on scope and significance), and then additional EAs or EISs for licensing potential large extended storage facilities in a single location (e.g., centralized storage), or multiple locations (e.g., regional storage). A GEIS may be developed to address the environmental impacts associated with extended storage of spent fuel at reactor sites, at decommissioned sites, or at potential regional sites. The GEIS would provide a starting point for the NRC's environmental reviews for site-specific license applications for potential large, regional ISFSIs. Developing a GEIS for more than one representative storage location would improve the efficiency of the licensing process by (1) providing an evaluation of the types of impacts associated with licensing a storage facility, (2) assessing impacts that are expected to be generic at storage facilities with specified characteristics, and (3) identifying the scope of impacts that must be addressed in site-specific supplemental EISs. The GEIS also would

provide information to aid in the preparation of the site-specific EISs and help the NRC maintain consistency when evaluating the license applications.

The staff may conduct certain near-term activities to prepare for the longer-term development of a GEIS. These include the development of a prioritized list of needs for a GEIS and the initiation of an environmental review public scoping process to identify storage and transportation issues appropriate for consideration in the GEIS. The final EIS developed for the Private Fuel Storage Facility license would be examined for generic insights and assessments that can be used for potential, large regional facilities. The decision to develop a GEIS (and overall scope) will also consider the industry's spent fuel management licensing plans for extended storage, as well as evolving national policy on potential central or regionalized storage facilities.

An examination of the NRC's generic environmental review documents for spent fuel transportation would be a component of the overall storage reviews and assessments. However, a review more focused on transportation could be undertaken separately to determine the additional impact analysis that may be necessary under the various extended storage scenarios. Transportation issues that could need additional environmental reviews (but may not be limited to) updating an assessment of the non-radiological impacts of spent fuel transportation; assessing the potential impacts of transporting SNF and HLW to a centralized location or to regional locations; assessing transportation of spent fuel after extended storage; assessing other conditions likely to occur but not covered by the specifications in 10 CFR 51.52, "Environmental Effects of Transportation of Fuel and Waste – Table S-4" (i.e., conditions that trigger the need for specific analyses in reactor license renewal EISs).

4.0 Cross-Cutting Strategies

This section specifies cross-cutting activities and strategies that will be applied to all initiatives described in this project plan, as applicable. The Commission directed these activities, in part, in SRM-COMDEK-09-0001. The strategies include RIPB enhancements, promoting enhancements of domestic codes and standards, promoting international cooperation on research activities and safety standard development; developing incentives for use of state-of-the-art technologies, and providing opportunities for stakeholder participation. As the project plan is implemented, the staff will assess the need to revise or add to the cross-cutting strategies identified in this section. For instance, the staff will consider adding safety culture as a cross-cutting strategy after the Commission has finalized its safety culture policy statement.³

Appendix B provides a schedule of major activities for the cross-cutting strategies. As a result of these activities, the staff expects to achieve the following outcomes in FY11 and FY12:

- Gap assessment report for potential RIPB regulatory enhancements
- RIPB plan to support EST program review
- Gap assessment report for domestic codes and standards needed to support EST
- Plan/strategy for engaging international working groups on EST
- Plan/strategy for addressing adoption of state-of-the-art technologies
- Communication plan for participation of stakeholders and other interested parties

³ Commission direction related to the draft Safety Culture Policy Statement appears in SRM-SECY-09-0075, "Safety Culture Policy Statement," dated October 16, 2009.

4.1 Risk-Informed and Performance-Based Enhancements

Objectives

- Perform gap assessment of activities and regulatory framework products that may benefit from RIPB enhancements.
- Perform additional assessments and develop risk insights, as appropriate, for supporting near term regulatory process improvements and EST framework development.
- Incorporate RIPB enhancements to process, guidance, and regulation updates as appropriate.

Summary

The purpose of this strategy is to systematically and objectively implement RIPB principles into major objectives of this regulatory program review. The first phase of this strategy will be an initial gap assessment of activities and regulatory products that may benefit from a RIPB approach. The gap study will also identify additional risk-insights and assessments that would be needed to implement risk-informed enhancements for both the near term process improvement objectives in Section 2 and the EST objectives of Section 3. In addition, existing and ongoing risk assessment activities for regulation of SNF storage and transportation will be identified for potential use in the process improvement and EST activities. Detailed plans will be developed for actual risk-informing implementation activities after completion of the gap assessment.

The "Risk-Informed Decision Making for Nuclear Material and Waste Applications" (RIDM), Revision 1 (ML080720238) has been developed for generic use in NMSS risk-informing activities and provides a systematic process for evaluating the feasibility of risk-informing improvements. The staff will tailor the risk-informing and performance-based enhancement strategy from the RIDM. Risk-informing implementation may include (1) applying existing risk insights to revise guidance, (2) obtaining additional data and developing risk insights to support future guidance or rule changes, and/or (3) examining potential new storage and transportation regulatory frameworks (e.g., regulations and guidance) that are based in part on risk analyses and performance measures. Finally, risk-informing strategies will also be implemented with the other activities and strategies in Section 4, as appropriate.

Discussion

SECY-98-144, "White Paper on Risk-Informed and Performance-Based Regulation," dated January 22, 1998 (ML003753601), defines the essential elements of a RIPB regulatory approach. RIPB regulation combines risk insights with a performance-based rather than prescriptive approach to regulation. Risk insights refer to the results and findings from risk assessments. In a RIPB approach, risk insights, engineering analysis and judgment, and performance history are used to focus attention on the most important activities, establish objective criteria based on risk insights for evaluating performance, develop measurable or calculable parameters for monitoring system and licensee performance, and focus on the results as the primary basis for regulatory decisionmaking.

RIDM specifies a conceptual framework for identifying and implementing risk-informed enhancements for spent fuel storage and transportation. RIDM defines a systematic process for identifying, assessing, deciding, and implementing RIPB enhancements. For those actions warranting potential risk-informed enhancements, the RIDM specifies a process to ensure that risk-informing is done cost effectively and is focused on the agency's strategic goals. In implementing the objectives and activities described in Sections 2 and 3, the staff intends to adapt the RIDM criteria when determining whether and how to adopt RIPB enhancements. The specific criteria evaluate the benefits, costs, value, and other limitations of implementing RIPB enhancements to the regulatory framework (e.g., new rules and guidance)

Previous risk studies have been developed for storage and transportation, and other studies are currently in various phases of progress; such as a spent fuel transportation risk assessment, a SNF criticality risk assessment, and severe transportation accident fire studies. As part of the initial gap assessment, the staff will review these studies for any useful risk insights that may be applied to the activities described in Sections 2 and 3 of this project plan. A core group of staff experienced in RIPB approaches used across the agency will steer the identification and implementation of major risk-informed enhancements. The core group will also include staff with experience in licensing and inspection of storage and transportation casks.

The RIPB implementation for the near-term regulatory process improvements will likely focus on improving guidance and regulatory processes (e.g., standard review plans, regulatory guides, and inspection procedures) with existing information or assessment that can be developed relatively quickly. Potential modifications to the existing 10 CFR Parts 71, 72, 73 and 74 regulatory frameworks would be examined for opportunities to enhance them with RIPB approaches, but significant risk-informed modifications to 10 CFR Parts 71, 72, 73, or 74 rules are not expected given the shorter timeframe for near-term process improvements.

~~The RIPB implementation for EST will focus on research, guidance, regulatory processes, and potential rule changes. Ongoing activities such as the spent fuel transportation risk assessment, SNF criticality risk assessment, and severe transportation accident fire studies will be integrated into the risk-informing strategies as appropriate. The staff will initiate other long-lead risk assessments early, to the extent practical considering the relationship of the assessments to parallel research activities identified in the Section 3 objectives. The staff will also coordinate with other agency activities that may yield risk insights for spent fuel storage, such as the potential work by RES on a new site Level 3 probabilistic risk assessment (SRM-M100218, "Briefing on Research Programs, Performance, and Future Plans," dated March 19, 2010; ML100780578).~~

4.2 Promoting Domestic Standards Development

Objectives

- Identify existing codes and standards that support the regulatory framework and perform gap assessment of revisions or new codes to support EST.
- Develop a plan for engaging consensus committees to encourage and support enhancement of domestic codes and standards.

- Participate on committees and support codes and standards development activities.
- Incorporate domestic codes and standards into regulatory frameworks as appropriate.

Summary

The goal of this strategy is to promote and facilitate enhancement of voluntary national codes and standards to support EST. The NRC cannot direct the development or enhancement of voluntary consensus standards, but can implement a strategy for developing a participatory influence on codes and standards development in order to support EST. The staff will (1) assess the suite of existing codes and standards that underpin the current safety basis for storage and transportation, (2) identify potential gaps in the application of those codes and standards to EST, and (3) actively engage, support, and collaborate with responsible consensus codes and standards committees to update appropriate codes and standards, as needed.

Discussion

The National Technology Transfer and Advancement Act of 1995 (Pub. L. No. 104-113) requires all Federal agencies to (1) consult with voluntary consensus standards bodies, (2) participate with voluntary consensus bodies in the development of consensus standards when such participation is in the public interest, compatible with agency missions, authorities, priorities and budget resources, and (3) use consensus standards as a means to carry out an agency's policy objectives or activities unless such use is inconsistent with applicable law or is impractical. The Office of Management and Budget has also issued Circular Number A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities. Although the NRC takes the position that the circular is not binding, the agency voluntarily follows its guidance.

The staff has historically participated with industry consensus standards organizations. In the areas of spent fuel storage and transportation, enhanced participation on both domestic and international codes and/or standards committees is another part of this strategy to promote and influence activities. As research and regulatory enhancements are developed, staff participation in working groups addressing industry consensus codes and standards offers an opportunity to inform the development of codes and standards to appropriately address issues associated with EST. The NRC will support development of EST-related codes, and to the extent practical incorporate into the regulatory framework enhancements discussed in Section 3 of this project plan.

4.3 Promoting International Cooperation

Objectives

- Engage the International Atomic Energy Agency (IAEA), Nuclear Energy Agency (NEA), and foreign competent authorities to collectively survey existing regulatory frameworks, international standards, and guidelines associated with interim storage and EST.
- Develop plans and international working groups to address common EST technical gaps and regulatory challenges and share research.

- Consider incorporation of international standards and research into regulatory frameworks, as appropriate.

Summary

The goal of this strategy is to promote and develop international cooperation activities for addressing technical challenges related to interim and extended management of spent fuel that are shared among nuclear countries. The first phase of the strategy includes engaging IAEA and foreign competent counterparts to collectively survey existing regulatory frameworks, international standards, and guidelines associated with interim and extended storage and transportation. The staff will examine the potential benefits of enhancing international standards or guidelines for interim and EST for use or adoption by the NRC. The staff will also engage foreign counterparts in identifying technical gaps and regulatory challenges of common interest that are associated with storage and transportation of SNF. Subsequent activities would include the development of plans and international working groups for addressing these common technical gaps and regulatory challenges. These gaps and challenges may be addressed through cooperation on shared international research and other activities such as safety guideline development.

The staff will also leverage the international experience gained from the NRC's participation in the Multinational Design Evaluation Program (MDEP) activities for new reactors. To the extent practical, the staff will work with international counterparts to develop a plan for applying similar philosophies, such as identifying commonalities in regulatory practices and harmonizing safety principles for interim and extended storage and transportation. At this time, the staff does not envision that the EST activities will result in the development of a new organization modeled after the Organization for Economic Development (OECD) – NEA MDEP activities. However, the staff will pursue working with our international counterparts to address EST, working within the existing IAEA and international fora.

The staff will also closely coordinate with other Federal organizations, such as the U.S. Department of Transportation (DOT) and DOE, which have roles in the international community for storage and transportation issues. The current NRC and DOT cooperation with IAEA, in maintaining a consensus on international transportation standards (i.e., TS-R-1), serves as a model for effective cooperation in addressing technical and regulatory challenges among nations. The NRC will support development of international standards related to EST and, to the extent practical, incorporate them into the regulatory framework enhancements discussed in Section 3 of this project plan.

Discussion

The staff routinely engages international counterparts in various areas such as international research, government regulatory groups, and foreign utilities. NRC senior managers participate on IAEA standing committees, including IAEA's Commission on Safety Standards (CSS), and IAEA's nuclear, waste, radiation safety, and transportation Safety Standards Committees. The staff will coordinate plans and use these opportunities to express its views on cross-cutting issues in this area, and to facilitate future international cooperation on interim and EST challenges.

The staff's communication plan for this effort, discussed in Section 4.5, will maintain an active listing of the staff's upcoming interactions with international stakeholders. Some international initiatives are already underway. As the staff completes the gap assessments and implements this project plan, it may identify other areas for international cooperation. Currently, the staff plans to continue discussions with regulatory representatives of several countries with mature spent fuel management programs, to maintain awareness of their programs and possibly share technical data or participate in their programs for EST.

The staff will also leverage the Spent Fuel Performance and Research (SPAR) cooperative research program to foster support for required technical studies. The NRC will continue to provide leadership within the international community and leverage the results of its programs where possible. Additional opportunities for promoting cooperation include participation on IAEA task groups and other international programs. The staff will participate in IAEA technical meetings, consultancies, coordinated research projects, and other meetings involving EST. The staff will also encourage research cooperation to the extent practical.

The staff notes that national competent authorities generally adopt and apply IAEA transportation standards in their domestic regulatory oversight of transportation (e.g., IAEA Safety Series No. TS-R-1, "Regulations for the Safety Transport of Radioactive Material"). This is important to ensure efficient commerce of radioactive materials between nations. An attempt to harmonize storage standards may be difficult given the interests and current practices of various nations. However, the staff will first focus on examining broader safety principles for EST, including addressing associated technical gaps. MDEP focuses primarily on the development and alignment of standards, through international working groups, for nuclear components related to the design and construction of new reactor plants. The staff will assess lessons from this cooperative interaction and apply similar philosophies to improve alignment on safety principles between international competent authorities. The staff will support development of international standards related to EST and, to the extent practical, consider incorporation into the regulatory framework enhancements discussed in Section 3 of this plan.

4.4 State-of-the-Art Technology Incentives

Objectives

- Perform licensing experience review of recent design approvals representing state-of-the-art technologies for EST.
- Engage industry and other stakeholders in obtaining insights on emergent technologies and perceived challenges to future certification and licensing of new technologies.
- Incorporate incentives to adopt state-of-the-art technologies into regulatory processes as appropriate.

Summary

The goal of this strategy is to encourage adoption of state-of-the-art technologies for storage and transportation, in an RIPB manner, by incentivizing the use of these technologies through regulatory processes. The staff will implement this strategy in several phases. The first phase will be to perform a licensing experience review of recent design approvals (e.g., within the last

5 years) that represent state-of-the-art technologies for storage and transportation. Some of these recent design approvals represent first-of-a-kind designs with a multiyear review cycle. The licensing experience review will identify process and regulatory barriers encountered during the design review that could be mitigated to streamline the approval process, as one potential incentive to industry stakeholders. The staff will give stakeholders the opportunity to provide feedback on successes and challenges with past reviews. The staff will also actively solicit industry insights on emergent technologies and perceived challenges to future certification and licensing of these new technologies. The staff will examine other methods for process incentives such as preapplication topical reviews and approvals, license review schedules and priorities for new technologies, standardization of analytical methods or design features, and implementation of new RIPB approaches for safety, licensing, and inspection decisionmaking. The staff will incorporate incentives, to the extent practical, into regulatory framework enhancements discussed in Section 3 of this project plan.

Discussion

Vendors of spent fuel storage and transportation casks and packages continue to submit innovative designs to support emerging customer needs. These designs include new materials (including materials not endorsed by the American Society of Mechanical Engineers Code) and innovative structural designs. These new designs often place increased performance demands on systems in terms of increased fuel assembly capacities, heat loads, and fissile mass. While applicants continue to develop state-of-the-art methods for structural, burnup credit (criticality), and heat transfer analyses, the baseline storage and transportation experimental data used to validate analytical methods remain relatively unchanged. These factors often result in a more in-depth audit review by the staff to ensure the analyses submitted by the vendor are technically sound in demonstrating that safety performance criteria will be satisfied. The current rigor of NRC analyses and regulatory practices for new state-of-the-art technology approvals may sometimes be viewed as hampering technology development. However, the staff must ensure adequate protection of public health and safety for these future designs which are often supported by little operational experience. The staff will explore methods to encourage adoption of state-of-the-art technologies for storage and transportation, by possibly incentivizing the use of these technologies through the NRC's regulatory processes, while maintaining an appropriate balance in achieving the agency's safety and security goals.

4.5 Stakeholder Participation

Objectives

- Develop a communication plan to ensure that the EST regulatory program review is conducted in a transparent, participatory, and collaborative manner with NRC stakeholders and other interested parties.
- Engage States, local governments, federally recognized tribes, and other interested parties.
- Coordinate with DOT, DOE, the Department of Homeland Security, and other Federal agencies.
- Engage industry and public interest groups.

- Engage international counterparts.
- Conduct public workshops and other meetings on program activities.
- Provide opportunities for public comment on key regulatory products.

Summary

The staff will develop a communication plan for implementing the project plan. The communication plan will identify key messages and meetings and expected outcomes with key stakeholders, States, tribes, Federal agencies, and other interested parties. The staff will seek stakeholder participation and collaboration to incorporate insights during implementation of the project plan, and development of regulatory products and decisions, as appropriate. To facilitate effective communication with stakeholders and other interested parties, the staff will identify key audiences for feedback, develop appropriate communication tools to ensure effective dissemination of information, and offer opportunities that encourage interested parties to provide feedback on evolving issues. These audiences will include members of the public, industry, State governments, federally-recognized tribes, Federal agencies, Congress and staff, and public interest groups. However, for security-related activities involving Safeguards Information or Classified Information, the NRC will only allow participation by appropriately cleared stakeholders who have a "need to know." The staff will also maintain and leverage existing networks that have been established for the spent fuel transportation and storage regulatory programs.

5.0 Schedule and Resource Management

The Division of Spent Fuel Storage and Transportation in NMSS will lead implementation of this project plan in coordination with other NRC Offices and Regions. An interoffice working group will be established to implement the project plan and facilitate coordination among NRC offices with shared responsibilities. The projected resources in FY10 and FY 2011 needed to implement the project plan are shown in Table 5-1. The projected resources beyond FY 2011 are dependent, in part, on the outcomes of initial gap assessments and stakeholder participation. Projected resources required to implement the project plan in FY 2012 are pre-decisional and are discussed separately in Enclosure 2 (Official Use Only). The staff will address these projected resource needs through the normal budgeting processes, pending Commission approval of this project plan. Appendix B lists the projected schedules of major activities in each area. The staff will revise NMSS and division-level operating plans to incorporate these activities, as appropriate. Additionally, the staff will establish performance measures to ensure the achievement of the desired outcomes of project plan implementation. Preliminary performance measures are listed in Table 5-2. During project plan implementation, the staff will refine and develop specific performance measures in each area, as needed.

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. Implementation is contingent on the recruitment, transfer, and training of staff with appropriate skill sets in FY 2010 and 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 EST plans, changes in national policy on EST issues, 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 5-1. Budgeted and Projected Resource Requirements

| Office | FY 2010 Budget ^a | | | FY 2011 Request ^b | | | FY 2012 Request ^c | | |
|-------------------|-----------------------------|--------------|--------------|------------------------------|--------------|--------------|------------------------------|----------|----------|
| | FTE | \$K | Total | FTE | \$K | Total | FTE | \$K | Total |
| NMSS ^d | 2.0 | 1,150 | 1,452 | 18.5 | 2,500 | 5,290 | - | - | - |
| RES | - | - | - | 1.1 | 900 | 1,066 | - | - | - |
| FSME | - | - | - | 0.9 | 0 | 136 | - | - | - |
| NSIR | - | - | - | 0.0 | 0 | 0 | - | - | - |
| Regions | - | - | - | 0.6 | 0 | 90 | - | - | - |
| TOTAL | 2.0 | 1,150 | 1,452 | 21.1 | 3,400 | 6,582 | - | - | - |

Table 5-2. Performance Measures

| Measures | Types of Metrics |
|---------------------------|---|
| Progress and Timeliness | <ul style="list-style-type: none"> The percentage of objectives that exceed milestone dates, within NRC control, for completion and the average delay time The timeliness of advance notice for public meetings regarding program review activities |
| Resources | <ul style="list-style-type: none"> The resource utilization rate and earned value, versus that projected for implementing the project plan. |
| Stakeholder Participation | <ul style="list-style-type: none"> Survey results from stakeholders and other interested parties regarding NRC openness and value-added of interactions Stakeholder input and perspectives on the effectiveness of interactions and on the adequacy of the opportunities to participate in the program review |

^a Includes resources approved as part of the FY 2010 Reprogramming Request.

^b Includes resources requested in the FY 2011 President's Budget plus a \$900K shortfall for research activities that has been requested on the FY 2011 Shortfall List during the formulation of the FY 2012 budget.

^c Projected resources required to implement the plan in FY 2012 are pre-decisional and are discussed separately.

^d Includes projected FTE for other offices to provide support and lead individual tasks within the project plan in FY 2011. However, projected resources for these offices are expected to be minor (e.g., less than 0.5 FTE/FY).

Appendix A –Potential Policy Issues

In Staff Requirements Memorandum (SRM)-COMDEK-09-0001, "Revisiting the Paradigm for Spent Fuel Storage and Transportation," dated February 18, 2010, the Commission directed the staff to identify "potential policy issues" related to the project plan describing the staff's efforts to thoroughly review the regulatory programs for extended storage and transportation (EST). In developing the project plan, the staff has identified four issues with potential policy implications. The staff has not yet fully examined these issues and, therefore, is not providing policy options or recommendations at this time.

The staff will further examine the four issues described below as part of the initial gap assessment and review activities specified in the project plan. The project plan includes activities to thoroughly examine these issues and provide policy recommendations to the Commission, as warranted.

1. Cask Certification by 10 CFR Part 72 Rulemaking

To satisfy the requirements of the Nuclear Waste Policy Act of 1982 (NWPA), the staff currently uses the direct-final rulemaking process to add new casks and cask amendment to the approved list in 10 CFR Part 72. This initially was a preferred approach, in part, because it was expected that a limited number of dry cask systems would be needed and independent spent fuel storage installation (ISFSI) licensees could select generic systems that satisfied their needs. However, the commercial desire for higher-capacity designs, and a trend towards customizing designs for specific sites have led to a steady progression of applications for new cask designs and cask amendment requests. The direct-final rule process adds about six months to the licensing action after the staff completes its work on the safety evaluation report for approval. The number and significance of public comments have generally diminished over time to the point that the staff questions whether the current rulemaking process is the best approach for providing public participation and approving casks in an efficient and effective manner, given the amount of extended time and resources in the process. The certificate amendment approval process has also lengthened over time, in part, because applicants have been submitting larger and more complex amendment requests to mitigate the delays in rulemakings for more discrete amendments. The staff will further examine this issue, as part of the license process review in Section 2.1, and identify any policy issues for consideration by the Commission, as appropriate.

2. Storage and Transportation Compatibility and Integration

Typically, NRC receives applications for storage cask designs well before the applicants request that the same design be certified for SNF transportation. Commonly, the reactor licensees have a relatively immediate need to store fuel onsite to maintain full-core offload capability. While many designs in the current generation of cask technologies are intended for use in both storage and transport, some vintage storage designs have been approved only for use in storage, and have been loaded with SNF. These casks may not be certifiable for transport under 10 CFR Part 71, and their contents may therefore need to be repackaged into new casks. Further, current storage casks that are designed for transportation use are being loaded with high-burnup SNF. Given issues with high burnup cladding integrity (see item 3 below) there are uncertainties if the SNF will be transportable in its current loaded configuration. As the staff implements the project plan, it will evaluate efficiencies that may be gained in the current licensing process, including approaches in enhancing compatibility and integration of storage

and transportation review procedures and regulatory requirements. The staff will further examine this issue, as part of the license process review in Section 2.1, and identify any policy issues for consideration by the Commission, as appropriate.

3. Spent Nuclear Fuel Long-Term Cladding Integrity

The NRC generally requires cladding integrity to be maintained during interim dry storage to ensure that the primary fission product barrier is maintained for the backend fuel cycle. This is an important safety requirement because the cladding (1) provides defense-in-depth as the primary fission product barrier, (2) provides geometry control for criticality safety during transportation, and (3) provides added confidence that fuel can be safely handled after spent fuel storage, and remains in a usable condition, regardless of ultimate disposition. The staff believes the cladding integrity requirements should be preserved in EST to the extent practical. However, the staff recognizes that the uncertainty associated with maintaining cladding integrity in both extended wet storage and dry storage modes, and subsequent transportation, may require consideration of new mitigating solutions. Such industry or regulatory solutions might include requirements to move fuel from wet pool storage modes into dry cask storage casks at certain time intervals, dry storage and transportation burnup limits, "canning" of high-burnup SNF within current dry storage cask technologies, new packaging technologies to safeguard against future cladding failures, new internal monitoring systems to periodically assess internal environment and fuel cladding conditions, and/or new technologies to safely repackage fuel on-site prior to transportation (e.g., dry transfer). The staff will further examine this issue as part of the safety program review efforts in Section 3.1, and identify any policy issues for consideration by the Commission, as appropriate.

4. Financial Qualifications and Assurance

The current regulatory structure for financial assurance and qualification for ISFSI licenses is founded on the premise that dry-cask storage is an interim operation, and that the U.S. Department of Energy (DOE) would provide for long-term spent fuel management, including bearing the costs of shipping the spent fuel from reactor sites to the permanent repository. Therefore, it was not incumbent upon ISFSI licensees to demonstrate financial assurance for these activities. However, DOE has not accepted SNF from licensees. As a result, some licensees have taken legal actions to seek compensation from DOE, including damages for the additional costs incurred by ISFSI operations. The future national policy on spent fuel disposition is uncertain, and it is unclear whether judicial settlements, legislative actions, or other types of agreements will result in DOE, for example, funding the costs associated with ISFSI operations for extended onsite storage of fuel. In the interim, the staff may need to consider how the licensees will finance operational expenses for uncertain lengths of extended storage time. These expenses could include extended storage operations, security personnel, monitoring, possible inspection and repackaging operations, and decommissioning. The staff will further examine this issue as part of the safety program review efforts in Section 3.1, and identify any policy issues for consideration by the Commission, as appropriate.

Appendix B – Projected Schedules

Figure B-1 and Table B-1 describe the projected schedules for the project plan. The projected completion of many activities in fiscal year 2012, and afterwards, is dependent on the results of initial gap assessments and reviews described in each area. Therefore, the projected schedules in latter phases will be adjusted based on the outcomes of the assessments. In addition, future Commission direction, stakeholder participation, or changes in the national policy of spent fuel management may require schedule changes as well.

Figure B-1: Projected Schedule Timelines (Calendar Year)

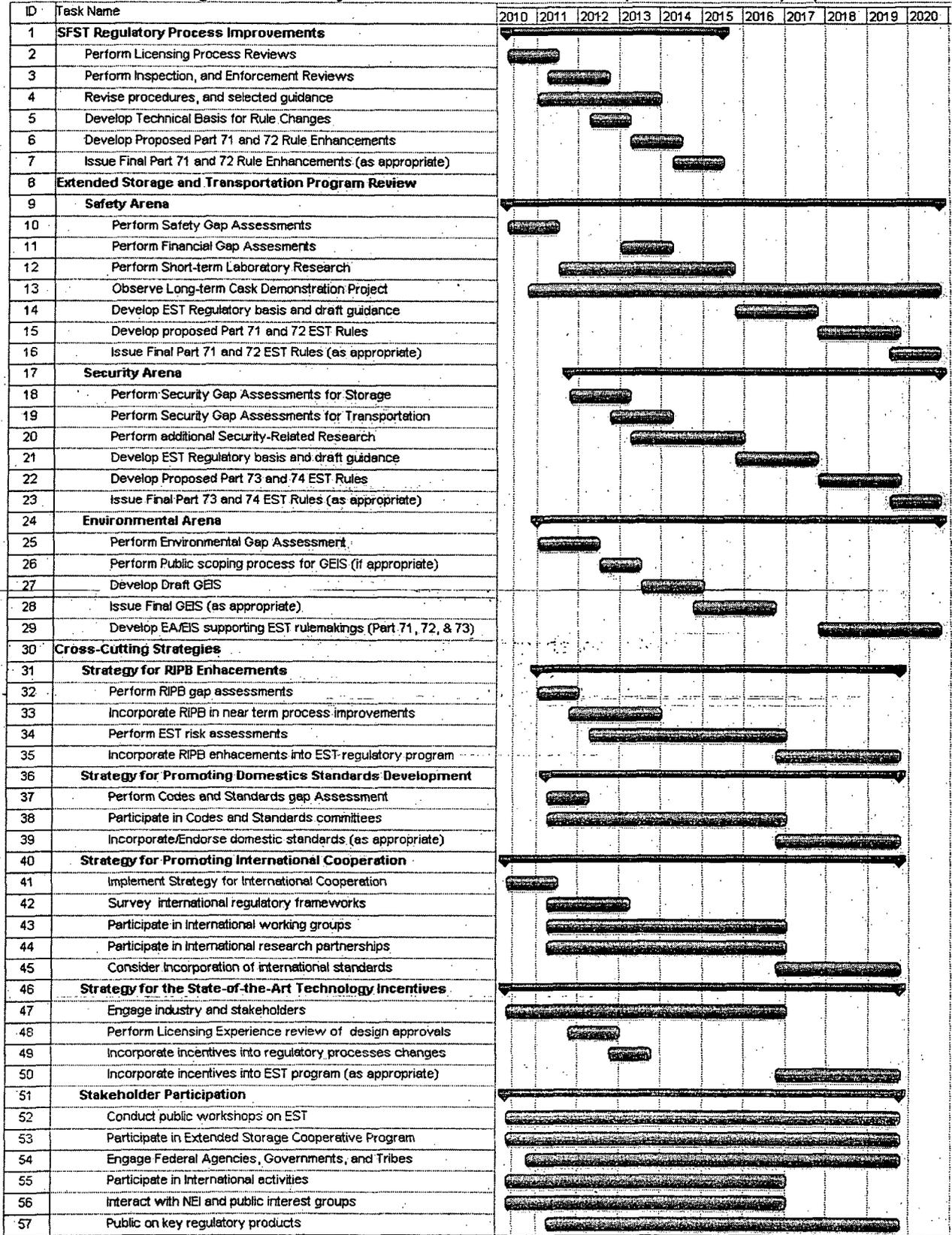


Table B-1: Projected Schedules (Fiscal Year)

| Review Area | Start | Finish |
|---|---------------|---------------|
| 2.1 and 2.2 SNF Storage and Transportation Regulatory Process Improvements | 3QFY10 | 3QFY15 |
| Perform Licensing Process Reviews | 3QFY10 | 3QFY11 |
| Perform Inspection, and Enforcement Reviews | 3QFY11 | 4QFY12 |
| Revise procedures, and selected guidance | 2QFY11 | 1QFY14 |
| Develop Regulatory Basis and Draft Guidance | 3QFY12 | 2QFY13 |
| Develop Proposed Part 71 and 72 Rule Enhancements | 3QFY13 | 3QFY14 |
| Issue Final Part 71 and 72 Rules (as appropriate) | 3QFY14 | 3QFY15 |
| 3.1 EST Program Review (Safety Area) | 3QFY10 | 4QFY20 |
| Perform Safety Gap Assessments | 3QFY10 | 3QFY11 |
| Perform Financial Qualification/Assurance Gap Assessment | 2QFY13 | 2QFY14 |
| Perform Short-Term Laboratory Research | 4QFY11 | 4QFY15 |
| Implement Long-Term Cask Demonstration Planning and Testing | 1QFY11 | 4QFY20 |
| Develop EST Regulatory Basis and Draft Guidance | 1QFY16 | 4QFY17 |
| Develop Proposed Part 71 and 72 EST Rules | 1QFY18 | 4QFY19 |
| Issue Final Part 71 and 72 EST Rules (as appropriate) | 4QFY19 | 4QFY20 |
| 3.2 EST Program Review (Security Area) | 1QFY12 | 4QFY20 |
| Perform Security Gap Assessments for Storage | 1QFY12 | 2QFY13 |
| Perform Security Gap Assessments for Transportation | 1QFY13 | 2QFY14 |
| Perform Additional Security-Related Research | 3QFY13 | 1QFY16 |
| Develop EST Regulatory Basis and Draft Guidance | 1QFY16 | 4QFY17 |
| Develop Proposed Part 73 and 74 EST Rules | 1QFY18 | 4QFY19 |
| Issue Final Part 73 and 74 EST Rules (as appropriate) | 4QFY19 | 4QFY20 |
| 3.3 EST Program Review (Environmental Area) | 1QFY11 | 4QFY20 |
| Perform Environmental Gap Assessment | 2QFY11 | 3QFY12 |
| Perform Public scoping process for GEIS (as appropriate) | 4QFY12 | 3QFY13 |
| Develop Draft GEIS for Various EST Scenarios | 4QFY13 | 1QFY15 |
| Issue Final GEIS (as appropriate) | 1QFY15 | 4QFY16 |
| Develop EA/EIS supporting EST rulemakings (Parts 71, 72, 73, & 74) | 1QFY18 | 4QFY20 |
| 4.1 Risk-Informed and Performance-Based Enhancements | 2QFY11 | 4QFY19 |
| Perform RIPB gap assessments | 2QFY11 | 1QFY12 |

| Review Area | Start | Finish |
|--|---------------|---------------|
| Incorporate RIPB near term process improvements | 1QFY12 | 1QFY14 |
| Perform EST risk assessments | 3QFY12 | 1QFY17 |
| Incorporate RIPB enhancements into EST program (as appropriate) | 1QFY17 | 4QFY19 |
| 4.2 Promoting Domestic Standards Development | 2QFY11 | 4QFY19 |
| Perform Codes and Standards gap assessment | 3QFY11 | 2QFY12 |
| Participate in codes and standards committees | 3QFY11 | 1QFY17 |
| Incorporate domestic standards into EST Program (as appropriate) | 1QFY17 | 4QFY19 |
| 4.3 Promoting International Cooperation | 3QFY10 | 4QFY19 |
| Implement Strategy for International Cooperation | 3QFY10 | 3QFY11 |
| Survey international regulatory frameworks | 3QFY11 | 2QFY13 |
| Participate on International EST working groups | 3QFY11 | 1QFY17 |
| Participate in International EST research partnerships | 3QFY11 | 1QFY17 |
| Consider Incorporation of international standards (as appropriate) | 1QFY17 | 4QFY19 |
| 4.4 State-of-the-Art Incentives | 3QFY10 | 4QFY19 |
| Engage industry and stakeholders | 3QFY10 | 1QFY17 |
| Perform licensing experience review of past approvals | 1QFY12 | 1QFY13 |
| Incorporate incentives into regulatory processes changes | 1QFY13 | 4QFY13 |
| Incorporate incentives into EST program (as appropriate) | 1QFY17 | 4QFY19 |
| 4.5 Stakeholder Participation | 3QFY10 | 4QFY19 |
| Conduct Public workshops on EST | 3QFY10 | 4QFY19 |
| Participate in Extended Storage Collaboration Program | 3QFY10 | 4QFY19 |
| Engage Federal Agencies, State and Local Governments, and Tribes | 1QFY11 | 4QFY19 |
| Participate in International activities | 3QFY10 | 1QFY17 |
| Interact with NEI and public interest groups | 3QFY10 | 1QFY17 |
| Public comment on key regulatory products | 3QFY11 | 4QFY19 |

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

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In re:

Docket Nos. 50-247-LR and 50-286-LR

License Renewal Application Submitted by

ASLBP No. 07-858-03-LR-BD01

Entergy Nuclear Indian Point 2, LLC,
Entergy Nuclear Indian Point 3, LLC, and
Entergy Nuclear Operations, Inc.

DPR-26, DPR-64

February 10, 2011

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CERTIFICATE OF SERVICE

I hereby certify that on February 10, 2011, copies of (1) State of New York's Answer in Support of the Admission of Clearwater and Riverkeeper's Proposed Waste Confidence Contentions and (2) Declaration of Adam J. Dobson and attachments thereto were served upon the following persons via U.S. Mail and e-mail at the following addresses:

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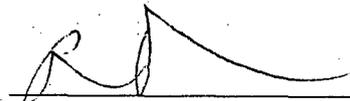
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