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March 19, 2012

Christine Pineda, Project Manager
U.S. Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Mail Stop EBB-2B2
Washington, D.C. 20555-0001

Dear Ms. Pineda:

Attached please find our comments on the U.S. Nuclear Regulatory Commission's Draft Report for Comment entitled *"Background and Preliminary Assumptions for an Environmental Impact Statement – Long-Term Waste Confidence Update"* (December 2011). Spent nuclear fuel is generated and/or stored in California at four operating and three decommissioned nuclear power reactors and several research and test reactors throughout the state. These include Diablo Canyon, San Onofre Nuclear Generating Station and Humboldt Bay, which are located on California's seismically active coast. The Environmental Impact Statement should analyze the site-specific risks of extended storage and transportation of higher burnup fuels in California in areas adjacent to high population centers that are susceptible to major earthquakes and flooding, including rising sea levels due to climate change.

We appreciate the opportunity to comment on this draft and NRC's commitment to a public process throughout this proceeding. It is essential that NRC's Waste Confidence Rule and Environmental Impact Statement allow for public input that is fair, transparent and inclusive so that communities affected by extended spent fuel storage and transportation have sufficient opportunity to participate meaningfully in this proceeding.

If you have any questions, please contact Barbara Byron at (916) 654-4976 or Kevin W. Bell at (916) 654-3855.

Sincerely,

Robert B. Weisenmiller

ROBERT B. WEISENMILLER
Chair and State Liaison Officer to the
U.S. Nuclear Regulatory Commission

Attachment

Implications for California's Nuclear Plants: California has a longstanding and continuing interest in NRC's initiatives to reassess and revise its regulatory framework for extended SNF storage, transportation and disposal. An Energy Commission representative participated in NRC's public meeting on October 6, 2011 in San Luis Obispo and in NRC's September 28, 2011 and January 30, 2012 webinars on NRC's Plan for Extended Storage and Transportation and Related Waste Confidence Considerations.

Spent nuclear fuel is generated and/or stored at several operating and decommissioned power and research reactors in California. These include the operating plants at Diablo Canyon and San Onofre Nuclear Generating Station (SONGS) and the shut down power reactors at Humboldt Bay and Rancho Seco. For example, Diablo Canyon and SONGS have generated as of 2011 about 2,839 metric tons of spent nuclear fuel. Together they generate about 94 metric tons annually. Through their current 40-year license period, both plants will generate about 4,228 metric tons of spent nuclear fuel. Through possible 20-year plant license extensions, they will generate another 2,140 for a total of 6,368 metric tons if they obtain 20-year license extensions. Until the United States develops a repository or away-from-reactor storage facility, this waste will continue to accumulate and be stored onsite. In addition, spent fuel is generated and stored at research and test reactors in California in San Ramon, Sunol, Sacramento, San Diego, and Irvine.

Local concerns include long-term spent fuel storage at Diablo Canyon and San Onofre in densely configured spent fuel pools in earthquake/tsunami susceptible areas. Other concerns include spent fuel transportation safety; degradation of SNF and packaging over time, particularly given higher burnup fuels; the need for site-specific analyses; plant vulnerability to natural events (e.g., earthquakes, flooding) and terrorist attacks; the adequacy of liability coverage; evacuation timeliness in an emergency; and the long-term reliability of institutional or corporate existence and management of the waste. The U.S. has no experience with a utility being in existence for 300 years – longer than the U.S. has been in existence. How can the NRC be sure that the plant owners, e.g., PG&E and Southern California Edison, will even exist in 300 years?

Accumulating spent fuel along California's coastline in seismically active areas may be a costly legacy to hand off to future generations – a large stretch of California's coastline, considered to be among the most beautiful and environmentally diverse in the world, could become a long-term hazardous waste dump not usable for other purposes. California ratepayers have had to pay billions of dollars for major seismic retrofits in the past for Diablo Canyon and San Onofre; extended SNF storage at these sites could result in additional high costs to ratepayers.

NRC's Approach: NRC's Waste Confidence update and EIS will evaluate the impacts of extended spent fuel storage and associated transportation for an analysis period of up to 300 years. NRC is proposing to analyze four scenarios: (a) continued spent fuel storage at reactor sites, (b) storage at regional facilities, (c) storage at one central site, and (d) limited reprocessing and co-located storage of resulting high-level waste. In

Attachment

California Energy Commission's Comments on the

U.S. Nuclear Regulatory Commission's Draft Report "Background and Preliminary Assumptions for an Environmental Impact Statement—Long-Term Waste Confidence Update"

March 19, 2012

Background: The U.S. Nuclear Regulatory Commission (NRC) is considering a long-term extension to the NRC's Waste Confidence (WC) decision and rule to account for the storage of commercial spent nuclear fuel (SNF) and high-level nuclear waste (HLW) for more than 60 years after the licensed life for operation of any commercial nuclear power reactor. Their analysis will assume that spent nuclear fuel is stored for extended periods at reactor sites and away-from reactor independent spent fuel storage installations for up to 300 years. As part of this review, the NRC is developing an environmental impact statement (EIS) which they plan to publish for public comment in 2017-2019. The NRC is seeking public comments on the scope of the EIS to better define the assumptions and scenarios for evaluating potential impacts from extended SNF and HLW storage and transportation.

The Waste Confidence rule and decision express NRC's assertion that SNF can be safely managed until it undergoes final disposition. NRC adopted the original Waste Confidence Decision and Rule in 1984 (10 CFR 51.23), which was updated in 1990, reviewed in 1999, and updated again in 2010. In the 2010 Decision and Rule the NRC found that: (1) Safe disposal in mined geologic repository is technically feasible, (2) at least one mined geologic repository will be available when necessary, (3) HLW and SNF will be safely managed until a repository is available, (4) SNF can be stored safely and without significant environmental impacts for at least 60 years beyond the plant's licensed life, and (5) onsite or offsite storage for SNF will be made available if needed.

The State of New York, et al. v. USNRC (Case No. 11-1045) and environmental groups, challenged the 2010 Waste Confidence Rule and related consideration of Environmental Impacts for failing to meet National Environmental Policy Act (NEPA) requirements. NRC is currently working to define the scope of the EIS, methodology and assumptions and is asking for stakeholder feedback on their Draft Report for Comment *Background and Preliminary Assumptions for an Environmental Impact Statement – Long-Term Waste Confidence Update,* (December 2011).

NRC's Waste Confidence Rule determines whether there is "reasonable assurance" that an offsite disposal solution will be available by the expiration of the plant's operating licenses, and, if not, whether there is reasonable assurance that the spent nuclear fuel can be stored safely at the reactor sites for an extended period beyond those dates.

updating its waste confidence rule, the NRC will develop and assess several storage and transportation scenarios and consider "composite generic sites". This will include considering the effect of aging on cask materials and spent fuel and the transportability of containers following long-term storage at reactor sites. NRC also will consider the interfaces and interdependencies between various types of storage, transportation and disposal.

Our comments on NRC's December 2011 Report and recommendations follow:

1. **NRC's consultation and cooperation with the states and communities affected by Extended Spent Fuel Storage and Transportation are essential.**

This proceeding will affect dozens of states and countless local communities throughout the U.S. that host spent fuel storage facilities. The states and communities affected by the long-term storage and transportation of spent fuel must have a voice in this proceeding and their issues and concerns must be fully addressed. We request that all future activities related to this proceeding be made accessible by teleconference and webcast and transcripts archived for review and that the NRC work in cooperation with States and station regional groups, including the Western Governors' Association and the Western Interstate Energy Board's High-level Waste Committee, in developing policies for waste management.

The Blue Ribbon Commission's recent report on the nation's spent fuel management program noted that a top-down approach for spent fuel management in the U.S. has not worked over the past few decades. They stated that, "Any attempt to force a top-down, federally-mandated solution over the objections of a state or community – far from being more efficient – will take longer, cost more and have lower odds of success." [1] They recognized that it will be "critical to provide a demonstrably fair process to those who are immediately affected by the waste management program. The program must be—and must be viewed as being—both fair and inclusive." [2]

These principles apply equally well to the NRC's spent fuel storage and waste confidence rule proceeding and NEPA analysis. Similarly to the Blue Ribbon Commission's recommendation regarding the national waste management program, this NRC proceeding must be consistent with the principles of science, fairness, safety, environmental protection and equity. We appreciate NRC's commitment to a public process throughout this proceeding. It is essential that the proceeding allow for public input that is fair, transparent, and inclusive and allows interested stakeholders sufficient opportunity to participate meaningfully in this proceeding. With this in mind, we request that additional workshops be held in California near Diablo Canyon and/or San Onofre.

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[1] Blue Ribbon Commission Report, July 2011, p. vi.

[2] Ibid, p. 7.

2. NRC's NEPA evaluation for the Waste Confidence Rule must take into consideration the site-specific environmental and economic impacts of long-term SNF storage and transportation and the impacts of aging and high burnup fuels on fuel cladding and packaging.

NRC's "composite generic site" approach is flawed in that adopting a single rule or analysis for all plant sites could seriously underestimate the potential environmental, economic, public health and safety risks at a given site. The potential costs of storing, maintaining, transporting and disposing of wastes at these sites is significant and should be taken into account on a site-specific basis. Generic analyses can grossly underestimate potential site or plant-specific impacts. For example, generic cost estimates for constructing new nuclear power plants in the U.S. a few decades ago did not predict the site-specific escalating construction costs for Diablo Canyon and San Onofre. Construction costs at these plants, largely due to seismic retrofit requirements, exceeded original estimates for each plant by about $5 billion. Our communities deserve a thorough and site-specific review of the potential environmental and economic impacts from long-term storage and transportation rather than "generic" highly speculative analyses covering 300 years.

Even with 10-20 generic sites analyzed to consider a range of factors, NRC's analysis could miss significant site-specific impacts. For example, site-specific environmental and economic analyses are needed of the risks of extended spent fuel storage of high burnup fuels at Diablo Canyon and San Onofre in seismically active areas, near high population areas, in densely packed spent fuel pools. In addition, as the National Academies' (2006) study of spent fuel storage concluded, the potential vulnerabilities of spent fuel pools to terrorist attacks are plant-design and plant specific and can be understood only by examining the characteristics of spent fuel storage at each plant.[3] They noted that there are substantial differences in the designs of spent fuel pools that make them more or less vulnerable to certain types of terrorist attacks.[4]

The Council on Environmental Quality (CEQ) NEPA Guidelines, 40 CFR 1500.1(b) says that: "NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments and public scrutiny are essential to implementing NEPA." Generic EISs have been done for many NRC decisions in the past, but the decision to leave highly radioactive waste in what may be effectively permanent custody of private utilities, particularly in areas of high population density and such dangers as high seismicity and rising sea levels, requires the very best scientific information. Such information simply cannot be generic, but must be site-specific. By nature, generic information "smoothes" the individual characteristics of plant location, waste characteristics, and utility capability

[3] National Academies, "Safety and Security of Commercial Spent Nuclear Fuel Storage", 2006, p. 8.

[4] Ibid.

into averages and is thereby missing the key physical and institutional details that are essential to making the full assessments and full environmental disclosures that NEPA demands.

The EIS should assess the site-specific environmental and economic risks associated with long-term storage and transportation of higher burnup fuels in dense storage configurations at sites with high seismic and flooding hazards, e.g., Diablo Canyon and SONGS. Pacific Gas and Electric Co. reported that their spent fuel pools store spent fuel in densities five times that of original plant designs. The EIS risk assessment should also take into consideration the characteristics of the current and prospective inventory of spent fuel and to what extent, if any, the safety of Extended Storage and Transportation (EST) varies for certain inventory subgroups compared with others.

The plant-specific analyses should include an analysis of site-specific factors such as proximity to high population centers; economic and environmental impacts of extended SNF storage and transportation on public health and safety, agriculture, fisheries, real estate, tourism, etc.; natural and manmade hazards (seismic, terrorist attack, flooding); route-specific analyses of SNF transportation risks; the adequacy of Price-Anderson Act liability coverage for a severe accident or incident; cask and pool designs; the transportability of aging casks; and the potential loss of access roads for emergency response and evacuation following a severe natural or manmade event (e.g., seismic event or terrorist attack). Moreover, Interstate-5 which is the primary access route to and from SONGS, is one of the most heavily congested freeways in the U.S. A generic analysis might be more appropriate if plants were built to standardized designs and if sites are more or less similar, but a generic analysis cannot adequately represent real conditions when there are so many different kinds of plant designs and widely differing site-specific characteristics in the U.S. such as traffic congestion, population density, natural and manmade resources, and local hazards, e.g., seismic and flooding hazards.

The EIS should analyze the risks of storing and transporting higher burnup fuels, including the impacts of higher burnup fuels on package integrity and durability over extended periods. The EIS should take into consideration materials and packaging degradation[5] over time and the package manufacturers' package long-term performance predictions. Today, discharge burnup levels are increasing and Diablo Canyon and SONGS have reported that, as a result of higher burnup fuels, spent fuel is being stored for longer periods in pools. Dual-purpose casks systems have been licensed for the dry storage of higher burnup spent fuel, but transportation licenses have not been obtained and are being considered on a case-by-case basis.[6] The EIS should

[5] DOE SNF includes about 2,700 MT (78% at Hanford, 8% at Idaho National Laboratory (INL), portions of which are damaged or degraded. The NRC's EST assessment should include an assessment of DOE spent nuclear fuel and explain how the findings related to DOE fuel will be applied to the much larger inventory of commercial SNF.

[6] Pacific Northwest National Laboratory, "Dry Storage Demonstration for High-Burnup Spent Nuclear Fuel- Feasibility Study", M.A. McKinnon, M.E. Cunningham, August 2003, PNNL-14390, p. vii.

The risks of extended spent fuel storage in seismically active areas is of particular concern to California since Diablo Canyon and San Onofre Nuclear are located on California's seismically active coast near high population centers. California's plants have the highest earthquake and tsunami hazard of all of the currently operating U.S. nuclear power plants. New seismic information is emerging at these plants sites. The California Energy Commission, as required by Senator Sam Blakeslee's Assembly Bill 1632, conducted a comprehensive seismic study of Diablo Canyon and SONGS in 2008 to assess the vulnerability of these plants to a disruption from a major seismic event or plant aging. As a result of this study and its recommendations, the California Public Utilities Commission, the California Energy Commission and the California Coastal Commission have directed Pacific Gas & Electric Co. and Southern California Edison Co. to complete advanced state-of-the-art seismic studies for Diablo Canyon and San Onofre. NRC acknowledged the special seismic risks for California's nuclear plants in the *Draft Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. We believe that it is essential that the results and findings from these advanced seismic studies for Diablo Canyon and San Onofre be included in some detail in NRC's Extended Storage and Waste Confidence Decision and Rule and EIS, as well as in NRC's plant license renewal reviews. This would allow the public and the NRC to examine fully the site-specific risks.

The NEPA Guidelines, Section 1502.15, provide that, "Data and analyses in a statement shall be commensurate with the importance of the impact. . ." Stating the numbers of people who are located near SONGS and Diablo shows the "importance" of any failure of SNF storage due to seismic events or flooding. Section 1502.22, deals with incomplete or unavailable information, since so much information for 300 years in the future is unavailable. Section 1502.22 says that if essential information is really unavailable, the agency has to summarize and explain the data gaps and include "a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community."

5. The 300-year time span for the EIS analysis for extended spent fuel storage and transportation impacts is too long and too speculative to be meaningful.

Evaluating impacts over 100 or 200-year increments for long-term SNF storage and transportation is too long a time period and the assumptions are too uncertain to be meaningful. How can predictions that far in advance be useful when there are so many uncertainties, e.g., packaging degradation over time, financial and technical capability of the waste generators and owners to properly manage the waste over extended periods of time, the transportability of casks after extended storage, seismic and flooding hazard estimates, repository availability, to name a few, over such a long time period? The likelihood of the original operating company being around to manage and clean up a reactor site long after the plant has stopped generating revenue for that company is questionable and could be small, particularly if over the long-term the spent fuel pool or

dry storage casks and packaging have degraded to such an extent that the costs for storing, repackaging, repairing facilities, and transporting the waste are extremely high. The potential burden to taxpayers from an event like at Fukushima Daiichi that exceeds the liability limits and financial provisions of the Price-Anderson Act must be evaluated.

Since at least the 1970s, the public was assured that a repository for permanently disposing spent fuel and high level waste would be available in the 1980s; later assurances were provided in the Nuclear Waste Policy Act that spent fuel acceptance would begin in 1998. Yet, today there is no SNF and HLW repository in the world. Clearly, these estimates turned out to be overly optimistic. Events at Fukushima Daiichi demonstrated how unexpected events at nuclear reactors can occur with catastrophic results, e.g., loss-of-coolant events at multiple reactors and station blackouts exceeding planning assumptions and capabilities. NRC's speculating 100 to 200 years into the future about spent fuel storage and transportation vulnerabilities, packaging integrity and degradation, etc., seems too uncertain to be meaningful. The NRC should consider the National Academies' 2006 study of spent fuel storage safety and security.[10] NRC's analysis should be as realistic as possible and grounded on accepted scientific principles and papers (see prior cite to 1502.22). NRC's analysis should also address the uncertainties about the risks of spent fuel storage identified in the NAS' 2006 study[11]. For example, the National Academies (2006) recommended that the NRC should undertake additional best-estimate analyses to more fully understand the vulnerabilities and consequences of loss-of-pool-coolant events that could lead to a zirconium cladding fire. They also recommended that the NRC take prompt and effective measures to reduce the consequences of a loss-of-pool-coolant accident and that the NRC should review and upgrade its security requirements for protecting spent fuel rods not contained in fuel assemblies from theft by knowledgeable insiders.

6. NRC's Extended Spent Fuel Storage and Transportation EIS should consider significant human factors including the adequacy of Price-Anderson Act liability coverage in the event of a severe accident or incident involving SNF storage or transportation.

NRC's Draft Report (Dec. 2011) states that "in the event licensees cannot fulfill their legal financial obligations, the U.S. Government will provide sufficient resources and protection to ensure continued safe and secure storage." NRC staff further stated in the Report that, "Loss of institutional control and oversight of spent fuel storage facilities is not viewed as a credible scenario during the period to be analyzed in the Waste Confidence EIS." However, it is uncertain whether the plant operators will still be in existence in a century or two or that the federal government will be financially able at that time to assume fully the liability for waste clean-up, repackaging and transportation at multiple sites throughout the U.S. if costly facility or package degradation and waste

[10] National Academies, "Safety and Security of Commercial Spent Nuclear Fuel Storage", 2006.

[11] Ibid.

storage problems develop at multiple sites. State public utility commissions have varying degrees of control that they can and will be able to exercise in times of declining revenues.

A possible decline in the nuclear industry (providing significantly less than 20 percent of U.S. electricity production) could result as older plants retire and new plant construction is delayed due to long-term, low natural gas prices, concerns about Fukushima-Daiichi, and high plant construction costs. This could jeopardize the industry's ability to fulfill its obligations, including financial obligations, to safely conduct long-term storage, decommissioning, and transportation operations over an extended period at multiple reactors and sites. The EIS should consider the possibility that the industry's financial ability to meet its obligations for extended spent fuel storage and transportation may be reduced, and that the federal government might lack the financial capability to fully compensate in the event of a major accident or event. Price-Anderson liability coverage is approximately $12.6 billion and yet the estimated costs associated with the Fukushima Daiichi accident far exceed this amount.

The NRC should consider the possibility that "the current structure of financial assurance for spent fuel storage (*may not*) continue to exist" (pg. 18). NRC should also consider how this could affect the financial capability of a significant portion of the 35 current reactor licensees, and discuss how financial assurance would be maintained under such circumstances. The EIS also should consider the possibility of plant owners, after the plants have shut down and are no longer generating revenue, declaring bankruptcy and abandoning the waste. Although NRC is requiring that funds be set aside for plant decommissioning, including spent fuel storage, the EIS should explain how the adequacy of funds over an extended period (centuries) of spent fuel storage can be assured, including any costs associated with a major accident or attack at the site. In addition, the EIS should include a discussion whether Price-Anderson Act liability coverage is adequate and would be available for privately owned away-from-reactor consolidated storage facilities.

7. NRC's Draft Report states that this long-term Waste Confidence EIS will not require reconsideration and possible updates to the rule and decision every 5-10 years. Periodic updates are needed as new and significant information is developed regarding the risks of long-term SNF storage and transportation.

NEPA Guidelines at 1502.9(c) (1) (ii) require a supplemental EIS when, "There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." New and significant information on the safety and security of SNF storage and transportation including packaging degradation, spent fuel pool and dry cask storage vulnerability to a natural or manmade event, and plant vulnerabilities to a major seismic event should be periodically considered in Waste Confidence EIS analyses and updates. The Waste Confidence EIS should be updated to reflect new and significant information that is derived from the planned advanced seismic studies at Diablo Canyon and San Onofre. The California Energy Commission and the California Public Utilities Commission have directed PG&E and SCE. to

address the uncertainties associated with the transportation and storage of spent fuel and package integrity after decades of storage, particularly storing higher burnup fuels. Increasing burnup generally results in increased levels of oxidation of the spent fuel cladding, higher fuel rod internal pressures due to higher fission gas release from the fuel pellets, and higher stresses in the cladding.[7] These phenomena need to be evaluated for their effects on fuel integrity during storage and subsequent operations including transportation, retrieval and placement in a waste package, and eventually disposal.[8]

3. **Given events at Fukushima, the NRC should reevaluate the 2010 Waste Confidence Rule's finding that there are no significant environmental impacts from storing spent fuel at least 60 years after a plant's license termination; this NRC proceeding and NEPA analysis should incorporate the lessons learned from Fukushima and their implications for extended spent fuel storage and transportation.**

NRC's evaluation of the risks of long-term SNF storage should consider the lessons learned from Fukushima Daiichi. The findings from these lessons learned studies should be incorporated into this proceeding and NEPA analysis. In light of recent events at Fukushima-Daiichi, the EIS should reevaluate the 2010 Waste Confidence Rule finding that spent fuel can be stored safely at least 60 years after a nuclear plant license terminates, particularly in light of the risks of long-term spent fuel storage in seismically active and flooding-susceptible areas and consider the risks to coastal plants from rising sea levels due to climate change. The Ocean Protection Council (OPC) released a guidance document on March 11, 2010 to local and state agencies in California indicating that they should consider the risks posed by sea-level-rise (SLR) for: "all decisions regarding areas or program potentially affected by SLR."[9] OPC indicated that the upper range of potential increases in sea level is between 43 to 69 inches (110 to 176 meters) by 2100 from current levels. The guidance document is silent with respect to SLR after 2100 but it is important to indicate that SLR rise will continue well beyond the end of this century as indicated by the Intergovernmental Panel on Climate Change and numerous scientific publications.

4. **The risks of long-term spent fuel storage in seismically active areas, including Diablo Canyon, San Onofre and Humboldt Bay sites, should be closely examined in this proceeding. The findings from updated seismic studies, as recommended by the California Energy Commission's AB 1632 Report, should be considered in this proceeding and in NRC's plant license renewal reviews.**

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[7] Ibid.

[8] Ibid.

[9] (http://www.opc.ca.gov/2011/04/resolution-of-the-california-ocean-protection-council-on-sea-level-rise/)

complete additional seismic studies as part of Diablo Canyon's and San Onofre's license renewal reviews. These studies will help inform any decisions about the cost and impacts from storing spent fuel at these sites. PG&E and SCE expect to complete their advanced seismic studies in December 2015.

8. **NRC's plan to evaluate a scenario co-locating reprocessing facilities at away–from-reactor spent fuel storage sites is premature and should be sidelined until the potential application and cost-effectiveness of reprocessing as part of the federal nuclear waste management program has been determined.**

The value of the EIS' analyzing scenario "d" for purposes of the Waste Confidence EIS is unclear. The appropriate reprocessing technology and its waste streams and storage/transportation requirements have not been determined. It would be a better use of analytical resources to focus on the first three scenarios, and, if necessary, conduct a supplemental EIS analysis at a point when, and if, the role of commercial reprocessing and its application in the nuclear waste management program has been made clearer. If reprocessing is analyzed, the EIS should mention that the National Academies' study in 2007 and other studies (MIT 2009) have concluded that the rationale for commercial reprocessing (Global Nuclear Energy Policy) is unpersuasive, relies upon technologies that are too early for commercial development (decades away) and too expensive (costing tens of billions of dollars), raises weapons proliferation concerns, and that there are major uncertainties about its ability to address the U.S. waste disposal issues.

The 2009 MIT Report "Update of the 2003 Future of Nuclear Power Report" said for the next several decades, a Once-Through Fuel Cycle using light-water reactors is the preferred economic option for the U.S. They also concluded that the benefits to resource extension (uranium) and waste management of recycling in light water reactors using mixed oxide fuel, as is being done in other countries, is minimal. Therefore, until it has been independently concluded that reprocessing is a cost-effective source of reactor fuel in the U.S., and until the major uncertainties about its ability to address U.S. waste disposal and weapons proliferation issues have been resolved, reprocessing should not be included among the scenarios for analysis in the EIS.

9. **The NRC Extended SNF and Transportation assessment should evaluate and recommend different waste management strategies or measures to reduce the risks associated with extended spent fuel storage, e.g., repackaging; reduced storage density in reactor pools; using the results of spent fuel storage vulnerability analyses for possible packaging and pool requirement upgrades; expedited transfer of spent fuel into dry storage; and early or prioritized waste disposal for certain fuel types and/or reactor sites.**

The NAS 2006 study on spent fuel storage safety and security recommended that plant-specific vulnerability analyses be conducted. Once NRC completes these vulnerability and consequence analyses described in the NAS classified report, the

NRC should evaluate and, as appropriate, recommend different waste management strategies or measures for different spent fuel subgroups or different plants to reduce the risks of extended spent fuel storage and associated transportation.