WCOutreachCEm Resource

From: Kessler, John [JKESSLER@epri.com]
Sent: Friday, February 17, 2012 7:33 PM
To: WCOutreach Resource
Cc: King, Christine; Sowder, Andrew; Waldrop, Keith; Rubenstone, James
Subject: Comments from the Electric Power Research Institute on the NRC document "Background and Preliminary Assumptions for an Environmental Impact Statement - Long-Term Waste Confidence Update" dated December 2011
Attachments: EPRI comments on the NRC extended storage EIS December 2011 report - final.pdf

EPRI is pleased to have the opportunity to provide comments on the subject NRC document. EPRI's comments are found in the attachment to this e-mail.

Sincerely,

John Kessler

_____

John Kessler
Manager, Used Fuel and HLW Management Program
1300 West WT Harris Blvd.
Charlotte NC 28262

Work: +1-704-595-2737
Fax: +1-704-595-2860

Federal Register Notice: 99FR99992
Comment Number: 35

Mail Envelope Properties (D121A400C8C6194EB5822CAFE62643A50C935B21)

Subject: Comments from the Electric Power Research Institute on the NRC document "Background and Preliminary Assumptions for an Environmental Impact Statement - Long-Term Waste Confidence Update" dated December 2011
Sent Date: 2/17/2012 7:33:03 PM
Received Date: 2/17/2012 7:33:18 PM
From: Kessler, John

Created By: JKESSLER@epri.com

Recipients:
"King, Christine" <CKing@epri.com>
Tracking Status: None
"Sowder, Andrew" <asowder@epri.com>
Tracking Status: None
"Waldrop, Keith" <kwaldrop@epri.com>
Tracking Status: None
"Rubenstone, James" <James.Rubenstone@nrc.gov>
Tracking Status: None
"WCOutreach Resource" <WCOutreach.Resource@nrc.gov>
Tracking Status: None

Post Office: uscltex01.epri.com

Files	**Size**	**Date & Time**
MESSAGE	418	2/17/2012 7:33:18 PM
EPRI comments on the NRC extended storage EIS December 2011 report - final.pdf	272619	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

17 February 2012

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

Subject: EPRI comments on the NRC document "Background and Preliminary Assumptions for an Environmental Impact Statement – Long-Term Waste Confidence Update" dated December 2011

Dear Ms. Pineda:

EPRI is pleased to have the opportunity to provide comments on the subject NRC document. While the details of EPRI's comments are found in the attachment to this letter, a short summary of EPRI's comments are provided below.

First, EPRI agrees with all five "findings" that support the current NRC "waste confidence" ruling. EPRI agrees that safe disposal in one or more mined geologic repositories will eventually occur and on a scale sufficient to dispose of all relevant waste streams such as spent fuel and high-level radioactive waste (HLW). More research and inspection data are needed to establish the length of time before one or more components of existing and future used fuel storage systems age to the point at which repair or replacement is required. However, EPRI is confident that under NRC's guidance and regulations, the nuclear industry (or other responsible party for the used fuel) can and will undertake an aging management program to conduct timely inspections, repairs, or component replacement such that used fuel can be safely stored for as long as needed prior to ultimate disposition. EPRI makes this statement without regard to any particular time period.

For the purpose of establishing technical bases for "waste confidence", the scope of the proposed extended storage EIS seems too broad. This EIS should focus on distinguishing environmental impacts specific to extended storage from those for shorter-term storage using current practice.[1] Otherwise, it is difficult for the public to provide meaningful input to the technical bases related to extended storage and "waste confidence".

While NRC proposes to include several scenarios in the Waste Confidence EIS, some of the scenarios assume a national policy that includes specific components that do not exist and may never exist, such as consolidated storage and reprocessing. Thus, there are only two scenarios that are based on current law and practice: (1) existing storage regulations that include technical bases for storage for up to 120 years;

[1] "Current practice" means, for example, a once-through fuel cycle (i.e., no reprocessing) with used fuel stored at the surface in various nuclear power plant locations (i.e., no consolidated storage facilities as they do not exist yet).

CHARLOTTE OFFICE
1300 West W.T. Harris Boulevard, Charlotte, NC 28262-8550 USA • 704.595.2000 • Fax 704.595.2860
Customer Service 800.313.3774 • www.epri.com

and (2) extended storage at nuclear power plant sites beyond 120 years. Other specific components in a revised national used fuel management policy, such as consolidated storage, reprocessing, or a disposal facility other than Yucca Mountain will have to be evaluated in separate NEPA analyses.

The NRC has stated that the 300-year evaluation period is arbitrary. As such, this time period is not part of any proposed national policy or regulations, such as revision to 10 CFR Part 72. Assessed impacts for a 300-year period may differ from those associated with a different time period. By using a 300-year assessment timeframe, there is a risk of inadvertently setting policy.

There have been several reports identifying technical R&D gaps in knowledge necessary to quantitatively evaluate some of the longer-term degradation mechanisms related to extended used fuel storage followed by transportation. Identifying and quantifying these mechanisms is essential to being able to conduct a meaningful extended storage EIS. While R&D on extended storage degradation mechanisms has been initiated, it will likely be several years before sufficient information will become available for a meaningful EIS can be conducted.

For all the reasons described above, the NRC should consider whether this is the appropriate time to initiate this EIS. It appears that a better strategy would be to initiate the extended storage EIS once (1) a national policy on used fuel and HLW management is established or at least proposed; and (2) additional information is collected on extended storage degradation processes and the magnitude of those processes through research and development programs that are currently ongoing.

I would be happy to clarify these comments or provide additional information. I can be reached by e-mail (jkessler@epri.com) or phone (704-595-2737).

Sincerely,

[signed]

John H. Kessler
Manager, Used Fuel and HLW Management Program

Attachment

Attachment
Detailed EPRI comments on the NRC document entitled "Background and Preliminary Assumptions for an Environmental Impact Statement – Long-Term Waste Confidence Update", December 2011

General comments:
For the purpose of establishing technical bases for "waste confidence", the scope of the proposed extended storage EIS seems too broad. This EIS should focus on distinguishing environmental impacts specific to extended storage from those for shorter-term storage using current practice. Otherwise, it is difficult for the public to provide meaningful input to the technical bases related solely to extended storage and "waste confidence".

Section 8.1: Preliminary Assumptions

Assumption 1: The continued use of nuclear power is assumed in projecting long-term spent nuclear fuel generation rates
Use of the DOE NE 3/25/2010 projection of nuclear power growth may be a bit optimistic. The Energy Information Agency (EIA) regularly projects electricity growth in the U.S., including nuclear power. NRC may want to reevaluate whether it should consider the EIA projection. The DOE medium scenario may be a useful benchmark or alternative scenario for nuclear power growth.

Assumption 2: Current light-water reactor spent nuclear fuel will be used as the baseline in extended storage scenarios
EPRI agrees that assuming only LWR used fuel is appropriate as other reactor types are not used commercially, and it still remains unclear whether other reactor types will be used at a commercial scale in the future.

There are many additional assumptions beyond simply assuming LWR fuel that could significantly affect the calculated impacts. These would include, among others:

- If NRC considers reprocessing scenarios, the amount of spent mixed oxide fuel (MOX) that would be generated, the burnup levels of the spent MOX, how the spent MOX is handled both in wet and dry storage would all have to be assumed. Widespread use of MOX fuel in existing and next-generation LWRs will require changes to reactor design and operation, and wet and dry storage system design and operation. Regarding storage changes, NRC would have to make a series of assumptions how utilities and storage and transportation system vendors would respond to storage of spent MOX that could have decay heats approximately three times higher than that of used uranium oxide fuel (UOX) at the same burnup.[2] Industry alterations to wet and dry storage to accommodate spent MOX assemblies may include: additional heat removal systems for pools;

[2] This decay heat level is based on the assumption that commercial – rather than defense – used fuel is reprocessed.

fewer assemblies in pools, which would require additional dry storage needs, and probably both smaller dry storage and transportation systems and entirely new system designs. All of these assumptions, which would be somewhat to significantly arbitrary, could impact the EIS assessment results.

- Future burnup levels for used UOX will have to be assumed. While the current regulatory guidance limits burnups in existing LWRs to 62.5 GWd/MTU, utilities generally remove the fuel from the reactor with burnups less than this maximum value. While the average burnups of used UOX has been increasing, utilities are interested in minimizing fuel failures as well as the amount of used fuel generated. Hence, future burnup levels are dependent on many factors, such as water chemistry, fuel duty, initial enrichment, and fuel design. While existing used UOX properties are known, NRC would have to make many assumptions about future trends in used UOX properties – especially since the EIS assessment period does not begin until mid century. Over the next 40 years, fuel designs may be significantly different than those in use today. This could impact assessments of the vulnerability of future fuel designs to degradation over extended storage periods.

- For all LWR used fuel types, assumptions will have to be made about the amount of time used fuel will need to remain in pools prior to being moved into dry storage that will also affect the EIS assessment results.

Assumption 4: Long-term transportation impacts will be based on current package technologies, transportation infrastructures, and regulatory requirements.
The first sentence of this assumption states: "Most spent fuel is contained in dual-purpose containers that meet the NRC's requirements both for transportation and for storage." While this is true at the moment, the amount of "high" burnup (>45 GWd/MTU) used fuel entering into dry storage will be increasing rapidly over the next decade or two. This is because almost all of the fuel currently being discharged from reactors exceeds this burnup level, and the amount of lower burnup fuel remaining in the pools to be transferred into dry storage is diminishing. In practice, current regulatory requirements preclude practical transportation of high burnup used fuel in any of the widely used dual-purpose systems without major modifications to system design and storage operations likely causing increased costs, increased worker dose, and potential increases in non-radiological hazards to workers and the public due to the need for more transportation shipments in smaller casks. By mid century, a large proportion of used fuel stored in existing dual-purpose systems will not be transportable – under current regulatory requirements. Hence, either NRC will have to relax the assumption that current regulatory requirements will remain in effect for the EIS assessment period, or NRC will have to make assumptions about the use of significantly different dual-purpose systems that would be able to receive transportation licenses for high burnup used fuel under existing regulations. The latter approach would require largely speculative assumptions about major revisions to dual-purpose system design to achieve high burnup used fuel transportation licenses, and would have implications for the assessment results.

The second sentence states: "However, the variety of single-purpose cask designs and aging effects on dual-purpose casks may limit long-term transportability. As a result, the EIS will consider the impacts of repackaging operations or other actions to ensure transportability after extended storage." This implies NRC will assume 100% of the single-purpose casks will require repackaging prior to transportation. It may be possible, however, for owners of single-purpose cask designs to be granted an exemption for a single shipment, such that perhaps not all single-purpose casks will require repackaging. The other point NRC makes in this sentence is aging effects for dual-purpose casks could also require repackaging. At present, there is not sufficient information for NRC to make well-founded estimates regarding how long dual-purpose casks will last before repackaging may be required. Again, NRC would need to make speculative assumptions about the frequency of repackaging for aging dual-purpose systems.

NRC has not made it clear which transportation impacts need to be considered in this extended storage EIS. It is not clear what will be gained by assessing transportation impacts in this EIS, since any impacts assessed would be generic in nature. NRC and industry's ongoing research, development and demonstration (RD&D) program of extended storage and transportation issues appears to be a more appropriate venue for NRC to examine transportation issues at this time.

There are some aging effects that could alter the environmental impact of used fuel transportation. NRC should limit its transportation impacts assessment to only those aspects of transportation specifically related to extended storage.

Assumption 5: Long-term storage and handling facilities will operate under a framework of aging management that is designed to monitor, detect, and mitigate significant aging impacts
EPRI agrees it is appropriate to assume an aging management framework will be used. At present, not enough is known about the long-term degradation mechanisms of storage systems to be able to make informed estimates of the type of monitoring, detection, and mitigation approaches that would be required. While there is high confidence the existing storage systems will maintain their safety functions for the existing licensing periods, at some time in the future, at least some components of the storage systems will need to be repaired or replaced. The technical bases for quantifying the frequency of repair or replacement of individual storage system components do not yet exist. Hence, postponement of this EIS until more RD&D is completed is necessary. It is likely that before the middle of this century much more will be known about the degradation of storage system components such that there will be a sound technical basis for making quantitative estimates of environmental impacts at that time.

The second paragraph in Assumption 5 states: "Some repackaging of waste before disposal is assumed as part of disposal facility operations". The amount of repackaging for disposal cannot be determined even within an order of magnitude without a reasonably well-known repository design that will govern waste package size(s). For example, the Yucca Mountain waste package size was 21P/44B, which is roughly a factor of two smaller than more recent dual-purpose canister (DPC) designs. For other repository designs, such as those in Sweden and France, the waste package size is only 4 PWR assemblies – roughly ten times smaller than recent DPC sizes. Thus, it is unclear what scenario(s) NRC intends to assume that would result in the need for only "some" repackaging. To EPRI's knowledge, the only geologic repository

system that has the potential of being able to directly dispose of dual-purpose canister sizes currently in use (thereby avoiding the need for repackaging) in the US would be one similar to Yucca Mountain; the proposed Yucca Mountain repository is able to handle much higher decay heat canisters than other geologies being considered.

Furthermore, it is not clear to EPRI how the need for repackaging for disposal purposes relates to the issue of extended storage. Repackaging for disposal may be needed no matter how long or short is the storage time period. If the storage period is extremely long such that the decay heat in existing storage system sizes has diminished to meet the more limiting thermal requirements of most disposal geologies other than Yucca Mountain, then the need for repackaging actually diminishes.

Given the need for repackaging is so intimately tied to the particular repository geology and design, it is not possible to make any sort of meaningful assessment of environmental impacts for a repository design other than that already completed for Yucca Mountain. In addition, the environmental impacts associated with repackaging operations for a specific repository will be evaluated in the NEPA analysis associated with the specific facility in the future. Therefore, for all the reasons stated in this section, repackaging for disposal should be excluded from this particular EIS.

Assumption 6: The storage of spent fuel will remain under a regulatory program comparable to the current program. Regulatory oversight and maintenance of storage facilities and activities, such as spent fuel repackaging, will continue, as appropriate. …
EPRI agrees it is appropriate to assume storage and transportation will both remain under a regulatory program. As discussed in EPRI's comments on Assumption 4, the current regulatory requirements do not allow for transportation of high burnup used fuel. Hence, the implications for maintaining "the current program" of regulations related to high burnup used fuel transportation could be significant.

In the middle of the first paragraph for Assumption 6, NRC states: "The NRC, as part of its regulatory oversight, continually assesses the need for additional safety or security measures". EPRI requests that NRC clarify whether it will assume it will require "additional safety or security measures" in the future that will affect environmental impacts due to, for example, the need for remediation or the probability or nature of releases due to a terrorist attack not in NRC's current regulations. If so, then this conflicts with Assumption 4 regarding the continuation of the existing regulations.

NRC should compare its decision not to assume loss of institutional control over the 300-year assessment period with the recommendations in the 2005 National Academy of Sciences report on the technical bases for Yucca Mountain standards. Such a comparison would be valuable as the NAS TYMS report is part of the basis for the existing national policy. Congress specifically asked the NAS to address the issue of how long it is appropriate to assume institutional control can be maintained.

Assumption 7: The EIS will assess the impacts of storing and transporting reprocessing wastes
As discussed earlier, it is unnecessary to include reprocessing scenarios (among others) in this particular EIS related to extended storage. If reprocessing becomes part of a future change to national policy, then an EIS specific to reprocessing will be required at that time.

Even if NRC persists in including reprocessing in this EIS, given the current national approach of no reprocessing, it is inappropriate for NRC to assume anything other than zero for the "low" reprocessing value. Furthermore, in EPRI's assessment, it is unlikely that up to 75% of the used fuel will eventually be reprocessed as there will be a large backlog of unreprocessed used fuel by the time reprocessing could be introduced.

Assumption 8: The EIS will assess impacts from a range of accident scenarios involving storage and transportation, and the accident analysis will be informed by the information available about a range of accidents, including recent events.
This assumption implies NRC may consider a range of accident scenarios not currently covered in its existing regulations. This is similar to NRC's proposal to include additional security measures in Assumption 6 in that both are in conflict with Assumption 4 regarding the use of existing regulations. Hence, it appears that NRC does not plan to assume the existing regulations will remain in effect. If changes to regulations are planned, EPRI recommends proposed changes to regulations be made by mechanisms such as rulemaking, rather than initial use in an EIS.

Furthermore, it is unclear to EPRI how consideration of the particular events at Fukushima Daiichi in March 2011 or the seismic event near the North Anna station in August 2011 will provide any additional insight in an extended storage EIS. To EPRI's knowledge, neither event caused anything more than minor damage to the wet or dry storage systems at those locations. Existing NRC off-normal and accident design requirements for storage and transportation systems appear to bound such events.

Regarding consideration of transportation in this extended storage EIS, as for Assumption 3, NRC has not made it clear which transportation impacts need to be considered. It is not clear what will be gained by assessing transportation impacts in this EIS, since any impacts assessed would be generic in nature. NRC and industry's ongoing RD&D program of extended storage and transportation issues appears to be a more appropriate venue for NRC to examine transportation issues at this time. Until additional information is gained from this RD&D effort regarding fuel condition or packaging condition after long-term storage, any near term impacts assessed by NRC as part of this EIS would either be repetitive of impacts assessed in the Yucca Mountain EIS or speculative.

Assumption 9: The Waste Confidence EIS will consider the impacts of terrorism
The legal background discussion NRC provides for this assumption seems to argue specifically against including impacts of terrorism. Since the Commission's position is that "terrorist attacks are too far removed from the natural or expected consequences of agency action to require an environmental impact analysis", it is inconsistent to consider such scenarios appropriate in this particular EIS.

Furthermore, it is not clear what additional insight specific to the environmental impacts of extended storage will be provided by considering impacts of terrorism. For example, how, specifically, will the characteristics of an extended storage system be factored into this EIS? And what are the current technical bases for the assumed future state of the storage system after an extended period?

Hence, the impacts of terrorism should not be included in an extended storage EIS.

Section 8.2: Preliminary Scenarios for Analysis
NRC states: "The staff will also consider analyzing impacts for one or more actual sites for comparison with the generic, composite sites." NRC has not made it clear what the benefit of considering individual sites are for comparison with the composite sites. By considering "actual sites" NRC may cause the public to think the assessments in the EIS for these sites represent the "actual" risk at these sites. Given the large number of assumptions required to conduct an EIS, especially over the time periods NRC proposes, it is not possible to assess the "actual" environmental impacts at any particular site. Hence, EPRI recommends NRC only consider generic, composite sites.

NRC also states: "Although the primary focus of the EIS is on identifying the potential environmental impacts from the use of currently available technologies for spent fuel management and transportation, the staff will consider the potential use of advanced spent fuel management technologies and alternative approaches to disposal." This seems fundamentally inconsistent with preliminary assumptions 2 through 4 that have to do with continued use of existing fuel types and storage technologies. This is an EIS to support extended storage of used fuel at nuclear power plant sites for the purpose of Waste Confidence. It is not clear why NRC would consider the potential use of advanced fuel management technologies (reprocessing) and alternative approaches to disposal. Any analyses associated with advanced technologies or disposal can and will be evaluated when those activities move forward.

Scenario 1: Extended onsite storage at reactor sites and offsite independent spent fuel storage installations
Given there is no national policy on centralized interim storage, this EIS should consider extended storage at reactor sites only. An EIS specific to centralized storage will be required when this option is considered.

Scenarios 2 through 4:
Based on arguments made earlier in this letter, these three scenarios should be eliminated.

Additional potential scenarios:
In general, it is difficult to justify scenarios that depart from existing practice. For example, it is conceivable that – for the 200- to 300-year period being considered – advanced fuel cycles will be fully integrated into the nuclear industry. Should NRC, then, develop one or more scenarios that include, for example, some combination of LWRs, fast reactors, LWR used fuel reprocessing, fast reactor used fuel reprocessing, MOX fabrication, etc.? As another example, some suggest extended storage is preferred over "early" disposal, as it leaves more advanced fuel cycle options open. For such thinking, then would it not be appropriate to include the environmental impacts from these advanced fuel cycles specifically because extended storage enables the viability of these advanced fuel cycle options? EPRI is not recommending NRC should do this,

but only to point out that it is difficult to develop a consistent set of assumptions over such long time periods for the purpose of distinguishing environmental impacts specific to extended storage.