Rulemaking1CEm Resource

From: RulemakingComments Resource
Sent: Thursday, December 26, 2013 1:59 PM
To: Rulemaking1CEm Resource
Cc: RulemakingComments Resource
Subject: PR-51 Waste Confidence
Attachments: 1201 ginsberg.pdf

DOCKETED BY USNRC—OFFICE OF THE SECRETARY
SECY-067

PR#: PR-51
FRN#: 78FR56775
NRC DOCKET#: NRC-2012-0246
SECY DOCKET DATE: 12/20/13
TITLE: Waste Confidence—Continued Storage of Spent Nuclear Fuel
COMMENT#: 00733

Hearing Identifier: Secy_RuleMaking_comments_Public
Email Number: 759

Mail Envelope Properties (377CB97DD54F0F4FAAC7E9FD88BCA6D0014433C4A154)

Subject: PR-51 Waste Confidence
Sent Date: 12/26/2013 1:58:34 PM
Received Date: 12/26/2013 1:58:35 PM
From: RulemakingComments Resource

Created By: RulemakingComments.Resource@nrc.gov

Recipients:
"RulemakingComments Resource" <RulemakingComments.Resource@nrc.gov>
Tracking Status: None
"Rulemaking1CEm Resource" <Rulemaking1CEm.Resource@nrc.gov>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	254	12/26/2013 1:58:35 PM
1201 ginsberg.pdf	404224	

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

PUBLIC SUBMISSION

As of: December 20, 2013
Received: December 20, 2013
Status: Pending_Post
Tracking No. 1jx-89eh-y3ve
Comments Due: December 20, 2013
Submission Type: Web

Docket: NRC-2012-0246
Consideration of Environmental Impacts on Temporary Storage of Spent Fuel After Cessation of Reactor Operation

Comment On: NRC-2012-0246-0456
Waste Confidence - Continued Storage of Spent Nuclear Fuel; Extension of Comment Period

Document: NRC-2012-0246-DRAFT-1201
Comment on FR Doc # 2013-26726

Submitter Information

Name: Ellen Ginsberg
Address:
1201 F Street NW
Suite 1100
Washington, DC, 20004
Email: ecg@nei.org

General Comment

See attached file(s)

Attachments

NEI_Comments_Waste_Confidence_Letter_with_Enclosure_12-20-13

ELLEN C. GINSBERG
Vice President, General Counsel & Secretary

1201 F Street, NW, Suite 1100
Washington, DC 20004
P: 202.739.8140
ecg@nei.org
nei.org

NUCLEAR ENERGY INSTITUTE

December 20, 2013

Ms. Annette Vietti-Cook
Secretary, U.S. Nuclear Regulatory Commission
Washington, DC 20555–0001
ATTN: Rulemakings and Adjudications Staff

Subject: Comments on Proposed Rule "Waste Confidence – Continued Storage of Spent Nuclear Fuel" and the Associated "Draft Waste Confidence Generic Environmental Impact Statement" (78 Fed. Reg. 56621, 78 Fed. Reg. 56776)(Docket ID NRC–2012–0246)

Dear Ms. Vietti-Cook:

On behalf of the commercial nuclear energy industry, the Nuclear Energy Institute (NEI)[1] appreciates the opportunity to provide comments on the proposed rule revising the agency's Temporary Storage Rule (10 C.F.R. § 51.23) and the associated draft Generic Environmental Impact Statement (GEIS). Our detailed comments on the proposed rule and draft GEIS are included in the enclosure to this letter.

This rulemaking is important to the commercial nuclear energy industry because the Nuclear Regulatory Commission's (NRC) environmental analysis and rule on temporary storage of used nuclear fuel during the continued storage period support licensing of new nuclear projects (*i.e.*, power reactors and independent spent fuel storage installations (ISFSIs)), as well as renewal of licenses for operating plants and ISFSIs.

In December 2010, the NRC published an update to the Waste Confidence Decision (WCD) and final Temporary Storage Rule (TSR) addressing the safe and environmentally sound post-licensed-life storage of used nuclear fuel at nuclear power plants.[2] Elements of the WCD and TSR were remanded to the

[1] NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

[2] 75 Fed. Reg. 81032, 81037; Dec. 23, 2010.

NRC by the U.S. Court of Appeals for the District of Columbia Circuit in 2012.[3] In response to the remand, the Commission directed the NRC staff to prepare a GEIS and to undertake a rulemaking to revise the TSR.

The NRC's response fully satisfies the Court's remand, as the agency has produced its most comprehensive analysis of the safety and environmental impacts of post-licensed-life used fuel storage to date. The agency has a long history of evaluating continued storage, and appropriately incorporated its previous work in addressing the Court's concerns. Further, the NRC staff has maintained the aggressive 24-month schedule set by the Commission, despite a government shutdown and while maintaining extremely high levels of transparency and public participation.

NEI's enclosed comments support the NRC's work and suggest a number of changes that would more clearly articulate the agency's conclusions that used nuclear fuel can continue to be stored in a safe and environmentally sound manner. Notably, our comments recommend changes to the title of the rule and GEIS, as well as the proposed rule language, which we believe will more clearly and directly capture the nature of the NRC's work in this area and the conclusions reached by the agency.

Finally, NEI commends the Commission for assigning a high priority to completing the draft GEIS and rulemaking, staffing the matter with knowledgeable and experienced personnel, and permitting broad public participation. The process has been a model of transparency in agency action. NEI encourages the Commission and NRC staff to continue the excellent work and to maintain the schedule to completion of the rulemaking.

Thank you for your consideration of these comments. If you have any questions or require additional information, please feel free to contact me at 202-739-8140 (ecg@nei.org) or Jerry Bonanno at 202-739-8147 (jxb@nei.org).

Sincerely,

Ellen C. Ginsberg

Ellen C. Ginsberg

[3] *New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012).

Enclosure

cc: Ms. Margaret M. Doane, OGC, NRC
Mr. Keith I. McConnell, NMSS/WCD, NRC

ENCLOSURE
NEI Comments on Proposed Waste Confidence Rule and Generic Environmental Impact Statement

Table of Contents

I. Approach to the Proposed Rule and Generic Environmental Impact Statement

A. The Concept of "Waste Confidence"

The concept of "Waste Confidence" originated in the context of a petition for rulemaking filed by the Natural Resources Defense Council (NRDC) in 1976, asking the agency to: (1) conduct a rulemaking to determine whether radioactive waste could be generated and disposed of without "undue risk to the public health and safety," and (2) refrain from issuing operating licenses until "such time as this definitive finding of safety can be and is made."[1] The NRC denied the petition, stating that it was not obligated to make the requested "definitive finding."[2] The NRC acknowledged that, when issuing operating licenses, it must be assured that waste can be stored safely until the waste is accepted by the government and removed from the site. But the agency also concluded that it is not necessary or reasonable to "insist on proof that a means of permanent waste disposal is on hand at the time reactor operation begins, so long as the Commission can be reasonably confident that permanent disposal … can be accomplished safely when it is likely to become necessary."[3] The NRC concluded that there was no statutory requirement to determine that high-level waste can be permanently disposed of safely prior to issuance of an operating license, and that even if there were such a requirement, "such a finding would not have to be a definitive conclusion…at the present time."[4] However, the agency noted that it would not continue to license reactors "if it did not have reasonable confidence that the wastes can and will in due course be disposed of safely."[5]

Upon review of the Commission's denial of NRDC's petition for rulemaking, the U.S. Court of Appeals for the Second Circuit in *Natural Resources Defense Council v. NRC* agreed with the NRC that the Atomic Energy Act (AEA) does not require the agency to make an "affirmative determination" that high-level waste can be permanently disposed of safely before granting an operating license.[6] The Court of Appeals focused on the issue of whether reactor licensing needed to be stopped pending the availability of a waste repository, and reasoned that Congress was aware of and "impliedly approved" the NRC's regulatory scheme, in which the safety of interim storage of spent fuel is determined separately from the safety of a permanent disposal facility.[7] In connection with its ruling that the AEA did not require a specific safety finding, the Court of Appeals took note of the NRC's statement, quoted above, that it would not continue to license reactors if it did not have "reasonable confidence" in the safe disposal of the waste.[8]

---

[1] Natural Resources Defense Council, Denial of Petition for Rulemaking, 42 Fed. Reg. 34,391 (July 5, 1977).

[2] *Id.*

[3] *Id.*

[4] *Id.* at 34,393.

[5] *Id.*

[6] 582 F.2d 166 (2d. Cir. 1978).

[7] *Id.* at 174.

[8] *Id.* at 174-175 n.13.

Subsequent litigation in the Vermont Yankee and Prairie Island license amendment cases ultimately led directly to the NRC's promulgation of its first "Waste Confidence" findings and the Temporary Storage Rule.[9] In those cases, the NRC's Atomic Safety and Licensing Appeal Board upheld two Atomic Safety and Licensing Board decisions allowing expansions of spent fuel storage capacity at each facility. The Appeal Board questioned "to what extent, if any, must the safety and environmental assessment of an application for authorization to increase the capacity of a spent fuel pool take account of the possibility that, of necessity, the pool will remain the repository for the spent fuel beyond the time when the reactor's operating license terminates."[10] In examining the issue under the National Environmental Policy Act (NEPA), the Appeal Board looked at whether it was "reasonably probable" that there would be no offsite repositories available at the end of the operating license.[11] The Appeal Board answered this question, in part, by looking to the rationale in the Commission's prior denial of NRDC's Petition for Rulemaking, stating that there was "no good reason why effect should not be given to the Commission's 'reasonable assurance' finding."[12] The Appeal Board concluded that, due to the Commission's policy declaration, for the purpose of licensing actions it must be presumed that a repository would be available when needed.

On appeal to the U.S. Court of Appeals for the D.C. Circuit in *Minnesota v. NRC*, the petitioners argued that the Commission's determination about the probability of repository availability should have been made based on evidence in an adjudicatory proceeding, rather than through a policy declaration.[13] The Court rejected that argument, but nonetheless questioned why the NRC's policy determination had not been made through a generic rulemaking. The Court of Appeals noted that the NRC was at that time undertaking a related rulemaking on Table S-3, and remanded the issue of interim, post-license storage to the agency for further consideration in light of the Table S-3 proceeding.[14] More specifically, the Court directed the agency to consider "whether there is reasonable assurance that an off-site storage solution will be available by the years 2007-09, the expiration of the plants' operating licenses, and if not, whether there is reasonable assurance that the fuel can be stored safely at the sites beyond those dates."[15]

In response to the remand in *Minnesota v. NRC*, the NRC initiated a hybrid evidentiary hearing process and rulemaking "to assess generically the degree of assurance now available that radioactive waste can be safely disposed of, to determine when such disposal or off-site storage will be available, and to determine whether radioactive wastes can be safely stored on-site past the

---

[9] *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), and *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Station), ALAB-455, 7 NRC 41 (1978).

[10] *Id.* at 46.

[11] *Id.* at 49.

[12] *Id.* at 50.

[13] 602 F.2d 412 (D.C. Cir. 1979).

[14] The Court of Appeals specifically noted that the Table S-3 rulemaking arose under NEPA, and was not equivalent to an AEA review. *Id.* at 418 n.8.

[15] *Id.* at 418.

expiration of existing facility licenses until off-site disposal or storage is available."[16] The resulting rule was promulgated in 1984 at 10 C.F.R. § 51.23, commonly referred to as the "Temporary Storage Rule" (TSR). The rule was accompanied by five "Findings" known as the "Waste Confidence Decision," which set forth the conclusions supporting the TSR.

The rule and associated Findings have been updated over time, and the 2010 WCD Findings were as follows:

> Finding 1: The Commission finds reasonable assurance that safe disposal of high level radioactive waste (HLW) and spent nuclear fuel (SNF) in a mined geologic repository is technically feasible;
>
> Finding 2: The Commission finds reasonable assurance that sufficient mined geologic repository capacity will be available to dispose of the commercial HLW and SNF generated in any reactor when necessary;
>
> Finding 3: The Commission finds reasonable assurance that HLW and SNF will be managed in a safe manner until sufficient repository capacity is available to assure the safe disposal of all HLW and SNF;
>
> 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 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 either onsite or offsite independent spent fuel storage installations; and
>
> Finding 5: The Commission finds reasonable assurance that safe independent onsite spent fuel storage or offsite spent fuel storage will be made available if such storage capacity is needed.

Although the TSR and WCD are used to support issuance of new and renewed licenses for nuclear power plants and ISFSIs, they comprise only one element of the agency's NEPA analysis for a site-specific license. The WCD and related TSR do not authorize individual licensing actions; rather, they address only the issues related to safety and environmental impacts of temporary, interim spent fuel storage.

The term "Waste Confidence" is a historical artifact from the NRC's policy determination addressed in the NRDC petition for rulemaking and the subsequent court decision. The term fails to transparently capture the purpose of the proposed rule, which relates primarily to the storage of spent fuel after the end of a reactor's operating life. For that reason, as will be discussed further below, NEI encourages the NRC to discontinue the use of "Waste Confidence" to describe the environmental impacts of interim storage.

---

[16] Storage and Disposal of Nuclear Waste, Notice of Proposed Rulemaking, 44 Fed. Reg. 61,372, 61,373 (Oct. 25, 1979).

Similarly, NEI believes that the title of the current proposed rule, "Environmental Impacts of Storage of Spent Nuclear Fuel Beyond the Licensed Life for Operation of a Reactor," should be changed. As discussed further below, NEI supports a rule title such as the "Storage of Spent Nuclear Fuel After Licensed Term of Operation." Similarly, the GEIS could be named the "Generic Environmental Impact Statement for the Storage of Spent Nuclear Fuel After Licensed Term of Operation." These titles would more clearly articulate the purpose and substance of the rule and GEIS.

B. Further Analysis Required by *New York v. NRC*

In 2012, the U.S. Court of Appeals for the D.C. Circuit remanded elements of the 2010 WCD update to the agency for further consideration under NEPA.[17] Specifically, the Court found that the WCD is a major federal action, and therefore, requires an environmental review addressing the impacts of continuing to store spent nuclear fuel after the operating term of a reactor. In three areas the Court held that the NRC had not satisfied its NEPA obligations: (1) assessing the environmental impacts of a hypothetical permanent federal failure to establish a high level waste repository; (2) assessing the risks of spent fuel pool leaks; and (3) assessing the risks of spent fuel pool fires.

The three specific issues identified by the Court implicated only two of the five WCD Findings. The Court vacated:

- Finding 2 ("The Commission finds reasonable assurance that sufficient mined geologic capacity will be available to dispose of the commercial [high-level waste and spent nuclear fuel] generated in any reactor when necessary"); and

- 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 for operation…of that reactor…").

The Court did not invalidate the other three updated WCD Findings or any other aspect of the TSR. As NEI stated in comments on the scope of the current Waste Confidence effort,[18] the NRC was not obligated to revisit the entire 2010 WCD or TSR. The NRC has a substantial record compiled over many years on these issues, including both the safety and environmental impacts of temporary spent fuel storage. That record is informed by the industry's experience managing, and the NRC's experience regulating, spent fuel storage at 63 licensed ISFSIs and over 80 spent fuel pools. This experience, as well as associated analyses and evaluations have been incorporated into the draft

[17] *New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012). The case did not address any aspects of the WCD under the AEA.

[18] Letter from E. Ginsberg, NEI, to C. Bladey, NRC, "Comments on Scope of Environmental Impact Statement Supporting the Rulemaking to Update the Waste Confidence Decision and Rule (Docket ID: NRC-2012-0246)" (January 2, 2013).

GEIS and the Statements of Consideration (SOC) for the revised rule, which addresses storage issues broadly and fully supports the proposed rulemaking.

C. A "Hard Look" at Environmental Impacts

NEPA requires that agencies take a "hard look" at the environmental consequences of major federal actions.[19] The hard look mandated by NEPA is subject to a "rule of reason."[20] As a result, an agency's environmental review need not include all theoretically possible environmental impacts arising out of an action, but only those impacts that are shown to have some likelihood of occurring.[21] Thus, NEPA only requires a discussion of "reasonably foreseeable" impacts.[22] Similarly, it is well-settled that environmental reviews need not consider "remote and speculative"[23] impacts or "worst case" scenarios.[24] Likewise, although an "informed and meaningful consideration of alternatives" is an "integral part" of the NEPA statutory scheme,[25] EISs need not discuss the environmental effects of alternatives that are "deemed only remote and speculative possibilities."[26] Viable alternatives must be examined,[27] but to be considered viable alternatives must meet the purpose and need of the proposed action.

Ultimately, an EIS must contain "high quality" information and "[a]ccurate scientific analysis."[28] After all, an EIS's purpose is to avoid speculation and ensure data is gathered and analyzed prior to decision-making.[29] The NRC has done just that with the draft GEIS.

---

[19] *Kleppe v. Sierra Club*, 427 U.S. 390, 410 n.21 (1985) (citation omitted).

[20] *See Davis v. Latschar*, 202 F.3d 359, 368 (D.C. Cir. 2000); *San Luis Obispo Mothers for Peace v. NRC*, 751 F.2d 1287, 1300-01 (D.C. Cir. 1984), *vacated on other grounds*, 760 F.2d 1320 (D.C. Cir. 1985).

[21] *See Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 & 2), ALAB-455, 7 NRC 41, 48, 49 (1978).

[22] *See, e.g., Wyoming Outdoor Council, Inc. v. U.S. Forest Serv.*, 165 F.3d 43, 49 (D.C. Cir. 1999); *Sierra Club v. Marsh*, 976 F.2d 763, 767 (1st Cir. 1992).

[23] *See Limerick Ecology Action v. NRC,* 869 F.2d 719, 739 (3d Cir. 1989); *Trout Unlimited v. Morton*, 509 F.2d 1276, 1283 (9th Cir. 1974).

[24] *See Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 354 (1989); *Edwardsen v. U.S. Dept. of the Interior*, 268 F.3d 781, 785 (9th Cir. 2001).

[25] *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1228 (9th Cir. 1988).

[26] *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519, 551 (1978).

[27] *Citizens for a Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9th Cir. 1985).

[28] *Seattle Audubon Soc. v. Espy*, 998 F.2d 699, 704-05 (9th Cir. 1993).

[29] *Found. for N. Am. Wild Sheep v. U.S. Dep't of Agric.*, 681 F.2d 1172, 1179 (9th Cir. 1982).

D. Generic Approach to Assessing Environmental Impacts of Temporary Storage is Permissible

In response to the remand in *New York v. NRC*, the Commission directed the NRC staff to prepare a generic environmental impact statement to support a revised WCD and TSR.[30] The Commission instructed the staff to use existing analyses to the extent possible, and to focus primarily on the three deficiencies identified by the Court of Appeals in that case. NEI believes the Commission's approach of preparing a generic evaluation incorporating the specific spent fuel storage issues identified by the Court is appropriate and that the three specific deficiencies should be the areas of primary focus.

The NRC has historically used a generic approach to evaluate Waste Confidence issues. The Court in *New York v. NRC* specifically recognized that the agency could consider the issues generically in an EIS if the document is bounding for conditions at all reactor sites.[31] The Court noted that both the D.C. Circuit and the Supreme Court in *Baltimore Gas & Electric Company v. NRDC* "have endorsed the Commission's longstanding practice of considering environmental issues through general rulemaking in appropriate circumstances."[32] In *Baltimore Gas*, the Supreme Court explicitly held that the NRC's generic evaluation of the environmental impacts of the nuclear fuel cycle in the Table S-3 rule was "clearly an appropriate method of conducting the 'hard look' required by NEPA."[33] Similarly, the Court in *New York* found "no reason that a comprehensive general analysis would be insufficient to examine on-site risks that are essentially common to all plants. … particularly [] given the Commission's use of conservative bounding assumptions and the opportunity for concerned parties to raise site-specific differences at the time of a specific site's licensing."[34] Thus, the appropriateness and legality of generically assessing the environmental impacts of continued spent fuel storage are well-settled.

The NRC's generic approach to the environmental review of a discrete set of issues common to all reactors will obviate duplicative and inefficient site-specific reviews of continued spent fuel storage issues. Certainly, as is discussed further below, the issue of the "no repository scenario" affects all sites similarly. The GEIS includes well-supported bounding analyses for these issues that encompass all reactor sites and operations.[35] Moreover, no evidence has been presented that would require that potential spent fuel pool leaks or fires necessitate site-specific consideration. The GEIS

---

[30] Staff Requirements – COMSECY-12-0016 – Approach for Addressing Policy Issues Resulting from Court Decision to Vacate Waste Confidence Decision and Rule (September 6, 2012).

[31] 681 F.3d at 480.

[32] *Id., citing Baltimore Gas and Elec. Co. v. NRDC,* 462 U.S. 87, 100 (1983).

[33] 462 U.S. at 101.

[34] 681 F.3d at 480. *See also Minnesota v. NRC*, 602 F.2d at 416 ("We agree with the Commission's position that it could properly consider the complex issue of nuclear waste disposal in a 'generic' proceeding such as a rulemaking, and then apply its determinations in subsequent adjudicatory proceedings.").

[35] Bounding analyses have also been previously accepted for NEPA reviews. *See, e.g., Baltimore Gas & Elec. Co. v. NRDC*, 462 U.S. at 107; *Natural Res. Def. Council v. NRC,* 685 F.2d 459, 486 (D.C. Cir. 1982).

includes well-supported bounding analyses for these issues that encompass all reactor sites and operations.

E. Proposed Action and Consideration of Alternatives under NEPA

The NRC has defined the proposed action as a rule (a revised TSR) that codifies the agency's generic determination on the environmental impacts of continued (*i.e.*, interim) storage of spent nuclear fuel at, or away from, reactor sites beyond a reactor's licensed life, pending disposal at a repository. This definition accurately characterizes the proposed action. The D.C. Circuit itself concluded that the "*rulemaking* at issue here constitutes a major federal action."[36] The TSR has always been based upon the Findings of the NRC's WCD and, as discussed below, should continue to reflect the conclusions from the GEIS and supporting record. The present amendment to the rule would incorporate the results of the NRC's GEIS, which specifically includes the issues identified by the Court of Appeals.

Under NEPA, the definition of the proposed action dictates the alternatives that the NRC must consider. NEI concurs with the three alternatives to the proposed rulemaking evaluated by the NRC: (1) no-action, (2) GEIS-only (no TSR), and (3) policy statement. Because the WCD and the related TSR do not in themselves authorize individual licensing actions, the NRC need not consider alternatives to licensing, or renewing licenses for, nuclear power plants in this GEIS. A "no licensing" alternative is not reasonable under NEPA for the present rulemaking because that approach is beyond the scope of the proposed action (which does not involve licensing a plant) and would not serve the purpose of the proposed action. Although the Court of Appeals found the WCD rulemaking to be a major federal action, the TSR and WCD comprise just one element in the agency's NEPA analysis for operating licenses, combined licenses, and renewed licenses. Alternatives to specific proposed licensing actions (including "no action") are considered separately in site-specific environmental reviews for the particular proposed projects or proposed actions.

Moreover, consideration of a licensing moratorium is not compelled by the AEA. In *NRDC v. NRC*, the Second Circuit explicitly addressed whether operating licenses can be issued in the absence of a definitive agency determination that high-level waste could be permanently disposed of safely.[37] The Court quoted remarks by Representative Holifield (Chairman of the Special Subcommittee (of the Joint Committee on Atomic Energy) on Radiation) at a hearing on radioactive waste disposal: "from the very beginnings of commercial nuclear power the Congress was aware of the absence of a permanent waste disposal facility, but decided to proceed with power plant licensing."[38] As the Court noted, Congress was (and is) fully aware of the NRC's regulatory scheme, in which the safety of interim storage of spent fuel is determined separately from the safety

[36] *New York v. NRC*, 681 F.3d at 473 (emphasis added).

[37] 582 F.2d 166 (2d. Cir. 1978).

[38] *Id.* at 170. The Court also pointed to the enactment of the Energy Reorganization Act of 1974 as further evidence that a moratorium on nuclear power reactor licensing pending an affirmative determination on safe, permanent disposal was not required. It noted that through the Energy Reorganization Act, Congress gave the NRC the authority to review the Department of Energy's future projects regarding long-term storage of high-level waste. *Id.* at 174.

of a permanent disposal facility.[39] The Court reasoned that if the Commission had interpreted the AEA to require an affirmative determination regarding the feasibility of safe, permanent disposal of high-level waste, no commercial production or utilization facilities would be in operation.[40] Ultimately, the Second Circuit found that "Congress did not intend such a condition."[41] Thus, the Court ruled that reactor licensing did not need to be suspended pending the availability of a waste repository. This decision, and the supporting reasoning, continues to hold today. Congress clearly established a separate scheme for waste disposal in the Nuclear Waste Policy Act, and has clearly not objected to reactor licensing actions (and license renewal decisions), notwithstanding the termination of the Yucca Mountain project or implementation of a new program. Moreover, the Secretary of the DOE continues to recognize and agree to satisfy the government's obligation to provide for disposal of used fuel and high level waste.

In sum, the NRC's responsibility is to identify any insurmountable technical barriers to safe storage of spent nuclear fuel until a repository is developed; and to robustly analyze and consider the environmental impacts of continued storage. To date, the NRC has identified no such barriers; and has found the environmental impacts of continued storage to be small. As explained by the Second Circuit in the *NRDC* decision, the NRC is not, however, responsible for the national energy policy decision to pursue development of commercial nuclear power in parallel with development of a repository. To the contrary, responsibility for that decision lies squarely with Congress and is not the subject of the draft GEIS or proposed rule.

With respect to the alternatives considered, NEI agrees that the "no-action" alternative is not preferred to the proposed action. No action would require the NRC to perform site-specific reviews of the issues identified by the Court. As discussed in Section 7.0 of the draft GEIS, repetitive reviews of continued storage issues would be time- and resource-intensive, and extremely inefficient. The environmental impacts of continued spent fuel storage can readily be resolved on a generic basis. The generic approach is also consistent with the Council on Environmental Quality (CEQ) guidance for achieving efficiency and timeliness under NEPA.[42]

Although the GEIS-only alternative would provide limited additional efficiency when compared to the no action alternative, it would still leave open the issue for individual licensing actions. Hence, the environmental impacts of continued storage would be subject to site-specific consideration, and could be challenged by petitioners in individual cases without a waiver under 10 C.F.R. § 2.335. As discussed in the draft GEIS, the temporary storage issues can and should be resolved through a rulemaking. Furthermore, NEI agrees with the NRC that site-specific analyses of these impacts would likely not reveal any new information that cannot be addressed in a generic analysis.[43]

---

[39] *Id.* at 174.

[40] *Id.* at 171.

[41] *Id.*

[42] *See* Memorandum from N. Sutley, Council on Environmental Quality, to All Heads of Federal Department and Agencies, "Improving the Process for Preparing Efficient and Timely Environmental Reviews Under the National Environmental Policy Act" (March 6, 2012).

[43] Draft GEIS at 7-10.

Should new and significant information arise for a particular site, it still could be presented in a petition under Section 2.335.

Lastly, the policy statement alternative, like the no-action alternative, would be inefficient in that it also would necessitate costly and time-consuming site-specific reviews. Therefore, NEI supports the recommendation in Section 8.7 of the draft GEIS that the proposed action – a rulemaking accompanied by a GEIS – is the preferred alternative.

F. Timeframes for Spent Fuel Storage Assessed in GEIS

The draft GEIS assesses the environmental impacts of spent fuel storage considering three timeframes: (1) short-term storage of no more than 60 years after the end of a reactor's licensed life for operation; (2) long-term storage of no more than 160 years after the end of a reactor's licensed life for operation; and (3) indefinite storage at a reactor site or at an away-from-reactor ISFSI, based on the assumption that a repository does not become available. The NRC assumes that spent fuel will be moved from spent fuel pools to dry cask storage no later than the end of the short-term storage period. Accordingly, long-term storage involves storage in dry casks or canisters combined with routine maintenance, and a one-time replacement of the ISFSI, casks and canisters, and the dry transfer system (DTS) facility.

NRC justifiably assumes that used fuel would be removed from reactor pools within 60 years of reactor operation.[44] This assumption is appropriately conservative and bounding. Experience indicates that the time to remove fuel from the pool would actually be considerably less than 60 years. At the 14 reactors shut down prior to 2003, movement of fuel to dry cask storage was accomplished in 2 to 34 years. Of the 4 plants which took the longest time, over 20 years, 3 of them shut down 8 or more years before dry cask storage technology was even developed. Since dry cask storage was first deployed in 1986, the average length of time for shutdown plants to move to dry storage has been 11 years.

The NRC's short-term and long-term timeframes reflect reasonable assumptions, and are supported by ample regulatory and technical information in the record of the environmental review and the rulemaking. For example, Section 1.8.3 of the draft GEIS clearly explains the assumptions underlying the agency's analysis, and provides the basis for those assumptions. Those assumptions are then relied upon, in conjunction with other technical information and experience, to assess the environmental impacts of continued storage at reactor sites (Section 4) and at away-from-reactor facilities (Section 5).

NRC has assumed, for the purposes of the long-term storage scenario, that spent fuel will be moved to new casks every 100 years, and that the dry transfer station and ISFSI pads can be replaced every 100 years.[45] While NEI agrees that this assumption is bounding and appropriate for use in this analysis, it is important to note that this is a very conservative assumption. Experience to date demonstrates that it will not be necessary to replace the ISFSI or DTS, or to repackage spent fuel,

[44] Draft GEIS 1-14.

[45] *Id.* at 1-14.

with this frequency. Experience further suggests that the installation of a DTS at each and every ISFSI location is also not likely to be necessary. If repackaging does become necessary, it is more likely that industry would consider bringing in portable systems for many locations or installing specially designed over-packs to prevent the need to open the existing canister. These activities could be accomplished with existing, proven technology and operational procedures. Portable transfer systems could be staged in central locations much like industry is currently doing with FLEX equipment as a preparedness measure for extremely severe events (earthquakes, floods, etc.) that might affect operating reactors. Furthermore, it is likely that advances in technology over the centuries would provide for improved repackaging methods that would have even smaller impacts.

Similarly, the assumption in section 4.1 and 4.7 of the draft GEIS that ISFSI replacement would take place on new land with old land "reclaimed" appears to overstate the associated environmental impacts.[46] It is more likely that ISFSI owners would either repair or reconstruct the concrete pad on which the casks sit in the same location, or replace sections of the pad as needed, thus eliminating or significantly reducing the need to disturb new land. If the NRC continues to assess impacts using this assumption, its conservatism should be recognized and the resulting small impacts should also be characterized as bounding.

NEI also agrees with NRC's statement that the current regulatory framework is adequate for multiple cask renewal periods.[47] In accordance with this framework, industry has conducted and will continue to conduct confirmatory studies as necessary to support future license renewals so that existing casks may remain in service for as long as needed – even if their use extends to hundreds of years. Examples of these studies include the Idaho National Laboratory Dry Storage Characterization Project completed in 2001,[48] ongoing canister inspections being conducted by EPRI at a number of sites,[49] and the ongoing DOE/EPRI High Burn-up Dry Storage Cask Research and Development Project.[50] Dry storage casks are robust concrete and steel structures with no moving parts. Multiple barriers provide defense-in-depth protection. Over 100 tons of concrete and steel forms a precisely engineered structure to protect every 10 tons of spent fuel. Over the last 30 years the nuclear industry has safely loaded over 1700 dry cask storage systems. All of these systems are still in service today and there has been no release of their radioactive contents. As long as these systems continue to be licensed for storage, their owners will continue to meet NRC requirements by following strict aging management plans.

NEI also believes that the short-term storage scenario is the most likely, and that the long-term and indefinite storage scenarios are unlikely. With respect to the indefinite storage timeframe, NEI concurs with the NRC staff's assessment in Section 1.8.3 of the draft GEIS that it would be

[46] Draft GEIS at 4-6 & 4-24.

[47] 78 Fed. Reg. at 56,782.

[48] "Dry Storage Characterization Project – Phase I: CASTOR V/21 Cask Opening and Examination," INEEL/EXT-01-00183, August 2001.

[49] Regulatory Issue Resolution Protocol Screening Form and Resolution Plan for Chloride-Induced Stress Corrosion Cracking (RIRP-N-10-01), May 31, 2013.

[50] DOE Contract No. DE-NE-0000593, April 16, 2013.

unreasonable to assume a gross and permanent failure of the Federal government to meet its responsibility for used nuclear fuel disposal. Moreover, the draft GEIS, Appendix B, Section B.2, supports a conclusion that the "no repository" scenario is highly unlikely. In the 2010 WCD update, the NRC reached fact-based conclusions regarding the technical feasibility of a repository and the progress of other nations to site and develop disposal facilities. Those conclusions are still valid, and the record supports the NRC's determination that the time period needed to develop a repository is approximately 25 to 35 years.[51] Furthermore, within the long-term timeframe there will be ample opportunity for the government to address its obligation, license a repository, and construct the facility. Therefore, the indefinite storage scenario is highly unlikely.

The indefinite storage scenario is also remote and speculative because it is contrary to existing federal law and assumes a complete and permanent government failure to fulfill the clear need and obligation to develop a repository.[52] In that regard, the "no repository" scenario arguably is a "worst-case scenario" that should not need to be considered under NEPA.[53] Nonetheless, the Court of Appeals specifically directed the agency to assess the environmental impacts of failing to establish a permanent repository, and NEI agrees that the NRC's consideration of an indefinite storage timeframe addresses the remand on this issue.

G. Assumptions for Institutional Controls

With respect to each of the timeframes assessed – including the indefinite storage scenario – the NRC has assumed in the draft GEIS that institutional controls would continue. The SOC explains in detail the basis for this assumption; namely, that the storage of spent fuel poses a sufficient hazard to the environment and humans such that losing regulatory controls and oversight is very unlikely.[54] The SOC also distinguishes this assumption from the general assumption that institutional controls will be lost post-closure at disposal facilities with buried waste, focusing on the fact that the dry cask storage systems assessed in the draft GEIS are highly visible systems requiring active maintenance.[55]

Assuming continued institutional controls is reasonable in both the short-term and long-term timeframes. In those timeframes, the nuclear fuel storage facilities will remain under NRC license and NRC oversight. The NRC will maintain authority to compel any actions required to assure

---

[51] *Id.* at B-6.

[52] *See In Re Aiken County, et al.*, 725 F.3d 255 (D.C. Cir. 2013). In determining whether an alternative is reasonable, courts also take into account legislation that forbids the alternative. "We do not suppose Congress intended an agency to devote itself to extended discussion of the environmental impact of alternatives so remote from reality as to depend on, say, the repeal of the antitrust laws." *Kilroy v. Ruckelshaus*, 738 F.2d 1448, 1454 (9th Cir. 1984)(internal citations omitted). Although the no repository scenario is not an "alternative" to the proposed action, the same principle applies in that a scenario that is contrary to the law should not be considered "reasonably foreseeable" under NEPA.

[53] *Robertson v. Methow Valley Citizens Council*, 490 U.S. at 359.

[54] 78 Fed. Reg. at 56,788.

[55] *Id.*

protection of public health and safety and the environment. Control of the licenses and nuclear material may not be transferred without NRC approval. The timeframes involved do not dictate a need for unreasonable, hypothetical scenarios that would involve loss of control of the facility or nuclear material, or loss of legitimate regulatory oversight.[56]

In the "no repository" scenario, the NRC staff remains justifiably reluctant to incorporate the additional conservative assumption that there will be a loss of institutional controls at the interim storage facilities. The existing WCD record and the draft GEIS support conclusions that the no repository scenario is highly unlikely, and that the no repository scenario without institutional controls at interim facilities is even more so. That notwithstanding, NEI recommends that – to very conservatively address the remand – the NRC even more clearly acknowledge that a conservative assessment of the impacts of a no repository scenario, without reliance on institutional controls, has already been completed. The "no action alternative" in DOE's Yucca Mountain EIS provides sufficient scope and depth to fully evaluate the extremely unlikely possibility that a repository will never be developed and that institutional controls will be lost.

DOE evaluated two scenarios in its "no action" alternative to Yucca Mountain: (1) spent fuel would remain at existing commercial sites under institutional controls for at least 10,000 years, and (2) spent fuel would remain at existing commercial sites in perpetuity, but under institutional controls for only about 100 years, after which time, institutional controls would be lost.[57] The second of these scenarios – loss of institutional controls after 100 years – is clearly a "worst case scenario" beyond the scope of NEPA.

At the time of the Yucca Mountain EIS, the NRC commented that a no repository scenario, coupled with the assumption of a loss of institutional controls, was unreasonable.[58] DOE explained that neither scenario considered in its "no action alternative" was likely, but that its assumptions regarding institutional controls were meant to bound potential environmental impacts. The same reasoning applies here. The NRC could more expansively respond to the remand by referencing the DOE EIS as bounding the environmental impacts of indefinite spent fuel storage for the no repository scenario, assuming a loss of institutional controls.

In the draft GEIS, the NRC appears to distinguish the scenario assessed in DOE's no-action alternative from the indefinite storage scenario assessed in the draft GEIS to explain the differences in assumptions regarding institutional controls.[59] The NRC states that the approach to institutional

---

[56] *See, e.g., Natural Res. Def. Council v. Kleppe*, 429 U.S. 1307 (1976).

[57] DOE pointed to 10 C.F.R. Part 61 – the NRC's regulations governing disposal of low-level radioactive material – as one the sources it used when choosing the 100-year timeframe for institutional controls. Part 61 states that active institutional controls cannot be relied on for more than 100 years. Substantive safety regulations that restrict the reliance on institutional controls do not diminish the reasonableness of assuming that institutional controls will continue to exist for purpose of environmental assessments under NEPA. Regardless, assuming that institutional controls will be lost after 100 years in the waste confidence GEIS would have resulted in an overly conservative assessment.

[58] Draft GEIS at 1-15.

[59] Draft GEIS at 1-14 – 1-15, n.2.

controls in DOE's EIS was related to the post-closure burial of radioactive waste, which is not relevant to the indefinite dry cask storage considered for the purposes of Waste Confidence.[60] Although NEI concurs with the NRC's approach to institutional controls in examining the indefinite storage scenario, this distinction is unnecessary. DOE specifically stated that the no-action alternative in the Yucca Mountain EIS "assumes that all commercial spent nuclear fuel would be stored in dry configurations in independent spent fuel storage installations at existing locations."[61] These dry storage systems are the very ones analyzed in the NRC's draft GEIS.

Including a reference to the Yucca Mountain EIS would not mean that the NRC would have arrived at the same factual or policy conclusions as DOE. Instead, a reference to the DOE analysis would simply recognize that the Yucca Mountain EIS contains information available to the public, which addresses the potential environmental impacts of a worst-case scenario of government inaction, coupled with failure of institutional controls – a scenario that the NRC described as requiring "unreasonable speculation."[62] Although evaluation of such a worst-case scenario is not required by NEPA, such a reference would clearly and definitively demonstrate that the NRC has more than adequately satisfied NEPA's disclosure objectives. While referencing the DOE analysis, the NRC should continue to stress that the reference is not based on any conclusion that it addresses a likely or even reasonable scenario.

Although we encourage the NRC to reference DOE's analysis, replicating the existing DOE Yucca Mountain Final EIS analysis would serve no useful purpose. For one thing, given that such an analysis would be addressing the very same casks over the very same time periods, it would not yield any new information. The Commission recognized the efficiencies that could be gained by referencing (but not repeating) DOE's analysis of the Yucca Mountain 'no action alternative' in SRM-COMSECY-12-0016, which stated that the staff "may adopt or incorporate by reference all or part of another agency's EIS. For example, the 'no action alternative' in DOE's Yucca Mountain EIS contains a foundation that the NRC should build upon."[63]

II. Environmental Impacts of Interim Spent Fuel Storage

NEI agrees with the conclusions in the draft GEIS that almost all environmental impacts resulting from the continued storage of spent nuclear fuel at, or away from, reactor sites would be small. In general, the NRC's assessment of environmental impacts from interim spent fuel storage is thorough and well-reasoned. The discussion below focuses on the two specific environmental issues identified by the Court of Appeals, as well as other specific issues addressed in the draft GEIS.

---

[60] *Id.*

[61] Department of Energy, "Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada," Vol. I at 7-18 (Feb. 2002).

[62] Draft GEIS at 1-14 – 1-15.

[63] SRM-COMSECY-12-0016 at 1.

A. Spent Fuel Pool Leaks

In *New York v. NRC*, the Court was not satisfied with the discussion in the 2010 WCD record of groundwater monitoring and reporting requirements, and inspection procedures, and found that the agency did not adequately consider the risks of future spent fuel pool leaks.[64] Appendix E of the draft GEIS sets forth a detailed discussion of the environmental impacts of spent fuel pool leaks during the short-term storage timeframe. NEI believes that the NRC adequately addressed the leaks issue and correctly concluded that the GEIS satisfies the Court's remand, as well as the NEPA "hard look" standard. Leaks are not an issue in the long-term storage scenario because the NRC has reasonably assumed that spent fuel will be moved to dry storage during the short-term timeframe.

The draft GEIS appropriately describes the current regulatory regime for spent fuel pool leaks, including the NRC's requirements and industry initiatives for groundwater monitoring and remediation of contaminated groundwater. NRC, in Section E.3, has done a thorough job of compiling and examining industry's historical experience with spent fuel pool leakage and has, importantly, noted that none of these events are known to have resulted in contamination of drinking water.[65] In accordance with NRC requirements, industry will maintain the capability to detect and mitigate any spent fuel pool leakage – as was done in the cases examined – as long as the pools are operational.

However, the NRC does not simply rely on its ongoing regulatory oversight to conclude that the environmental impacts of spent fuel pool leaks during the short-term storage timeframe will be small. The draft GEIS discusses the minimum requirements for spent fuel pool design and maintenance, operational practices, site hydrogeological characteristics, and radionuclide-transport properties that apply at all sites and that provide reasonable assurance that there is a very low likelihood that an undetected leak from a spent fuel pool will migrate offsite.[66] These considerations are all generic, and obviate further site-specific assessments. Furthermore, in the unlikely event that a spent fuel pool leak migrates offsite, the draft GEIS assesses the potential for impacts on groundwater, surface water, soils, and public health using a bounding approach. The draft GEIS concludes that the environmental impacts of a spent fuel pool leak during continued storage would be small.[67]

Based on operating experience, NEI agrees that impacts to groundwater would be small because it is highly unlikely that a leak of sufficient quantity and duration could occur without detection, or that migration of such a spent fuel pool leak would proceed at a rate that could not be mitigated before there would be any contamination of drinking water. Similarly, the impacts of spent fuel pool leaks on surface water would be small because, even in the highly unlikely event that undetected spent fuel pool leakage flowed continuously and unimpeded to local surface waters, the quantities of radioactive material discharged to nearby surface waters would be comparable to

[64] 681 F.3d at 481.

[65] Draft GEIS at E-21

[66] *See, e.g.,* 10 C.F.R. § 50.65 (maintenance rule) and 10 C.F.R. § 100.20(c) (siting criteria).

[67] Draft GEIS at Iviii – Iix.

values associated with permitted, treated effluent discharges from operating nuclear power plants. This is assured by programs put in place to meet the requirements of a 2007 industry groundwater protection initiative that addresses "inadvertent releases" that "are well below the NRC's limits that ensure protection of the public health and safety."[68] With respect to the impacts on soil, the NRC correctly concludes that the leakage would be detected or absorbed onsite before migrating offsite, assuring that environmental impacts would be confined and small.[69] Lastly, as a result of the low probability of a leak affecting offsite groundwater sources, the impacts to public health resulting from a spent fuel pool leak during the short-term timeframe also would be small.

In sum, the NRC has collected substantial data on the effects of spent fuel pool leaks. The draft GEIS extensively discusses factors that affect the likelihood that spent fuel pool leaks will migrate offsite and impact offsite resources. Although past experience does not guarantee future results, operating experience is important. Experience is the basis for many of the upgrades and initiatives that have been put in place across all U.S. reactor sites. Moreover, experience is a useful predictor of future performance: it allows the industry and the NRC to project realistic risks as opposed to highly speculative, hypothetical risks. Coupled with continued regulatory oversight, there is ample support for the NRC's conclusions in the draft GEIS that the potential impacts involving spent fuel pool leaks would be small.

B. Spent Fuel Pool Fires

The Court of Appeals remanded the issue of potential spent fuel pool fires to the NRC based on its finding that the agency had failed to examine the consequences of spent fuel pool fires "at all."[70] The Court agreed with the NRC's general approach to risk – that an overall low risk driven by a low probability could justify a finding under NEPA of "no significant impact." However, the Court determined that the NRC in the 2010 WCD update had excluded spent fuel pool fires based on low probability. The Court did not believe that the agency had made the case that the probability of a spent fuel pool fire was low enough to be considered "remote and speculative" and, therefore, required an analysis of both the probability and consequences of spent fuel pool fires.

Contrary to the perception of the Court, the NRC's 2010 WCD update did not ignore the consequences of spent fuel pool fires. Instead of dismissing the consequences of a spent fuel pool fire out of hand (as it might have done had it viewed the risk as "remote and speculative"), the NRC concluded that the likelihood of a fire is very low, such that the overall risk (including consequences) is likewise very low. This conclusion was supported by agency studies (such as NUREG/CR-6451 and NUREG-1738, both referenced in the 2010 WCD update) of the probabilities and consequences of spent fuel pool fires, leading to determinations regarding overall risk and environmental impacts.

[68] NEI 07-07 "Industry Ground Water Protection Initiative – Final Guidance Document," Aug. 2007.

[69] Draft GEIS at E-18.

[70] 681 F.3d at 481-482.

The NRC's use of probability-weighted consequences to determine overall risk in environmental impact reviews has been upheld by the Courts. In *Carolina Environmental Study Group v. United States*, the Court found that the Commission's general consideration of the probabilities and severity of a Class 9 accident did not amount "to a failure to provide the required detailed statement of its environmental impact."[71] There, the Court ruled that it was "entirely proper, and necessary" for the agency to consider both the probabilities and consequences of Class 9 accidents when assessing the environmental impacts of those accidents.[72] It reasoned that "[t]here is a point at which the probability of an occurrence may be so low as to render it almost totally unworthy of consideration. Recognition of the minimal probability of such an event is not equitable with nonrecognition of its consequences."[73] It follows that very low probability of an occurrence can lead to a finding of no significant impact, notwithstanding the population distribution and density, and the hypothetical consequences at any particular site.

In Appendix F of the draft GEIS, the NRC has continued to follow this approach appropriately in assessing the environmental impacts of spent fuel pool fires. Fully addressing the Court's remand, the discussion in Appendix F confirms the extremely remote probability at any site, but potentially severe consequences, of a spent fuel pool fire. The NRC's assessment is based on a substantial technical record that has been developed on this issue over many years by the NRC and its contractors. The NRC has presented data on both short-term and long-term health effects, as well as economic consequences (including evacuation and relocation costs, property damages, and cleanup and decontamination costs). The draft GEIS assessment supports a conclusion of low overall risk and therefore no significant environmental impact. NEI agrees that the environmental impacts associated with a spent fuel pool fire would be small based on the probability-weighted consequences of such an event at all existing reactor sites.

In particular, NUREG–1738, "Technical Study of Spent Nuclear Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants" (2001) finds that the probability of a spent fuel pool fire is very low. Regulatory requirements imposed since the study was conducted make a spent fuel pool fire even less likely.[74] Furthermore, *the likelihood of a spent fuel pool fire diminishes to zero as fuel cools.* Therefore, this issue applies only to the very early stages of the short-term storage timeframe.

NEI also agrees with the NRC's conclusion that the probability-weighted population doses and economic consequences would be comparable to the values calculated for a reactor accident, as estimated in the 1996 and 2013 License Renewal GEIS. Furthermore, mitigation measures implemented by reactor licensees (including measures adopted or being adopted after the Fukushima event of March 2011) further reduce these consequences, supporting the conclusion that environmental impacts of storage would be small. In total, the analysis of spent fuel pool fires in

[71] 510 F.2d 796, 799 (D.C. Cir. 1975).

[72] *Id.*

[73] *Id.*

[74] *See* Draft GEIS at F-11 – F-12.

the draft GEIS is exactly as the Court required – it assesses the consequences of this very low probability of this type of event and the overall impact based on a risk assessment.

Lastly, NEI strongly encourages the NRC to update Appendix F to reference the NRC's recent spent fuel pool "Consequence Study."[75] The study represents a significant addition to the body of work currently cited and further confirms NRC's conclusion that the impacts of spent fuel pool fires would be small. The most notable conclusion of this more recent study is that, for the scenario examined, "spent fuel is only susceptible to a radiological release within a few months after the fuel is moved from the reactor into the spent fuel pool."[76] Given the brevity of the period of concern, the overall risk of spent fuel pool fires resulting from total drain down of a spent fuel pool during the considerable longer time periods relevant to waste confidence would be virtually zero.

C. Acts of Terrorism

The NRC has postulated that the environmental risk of a terrorist attack on a dry spent fuel storage facility is small because the probability of such an event is miniscule.[77] While that is certainly true, further assurance that the risk is small involves the consideration of the potential population exposure that might result from a highly improbable, but successful terrorist attack on a dry spent fuel storage system.

During the presentations and discussions provided by industry to the Blue Ribbon Commission on America's Nuclear Future (BRC) on the safety of dry spent fuel storage, an evaluation was provided to validate the comparatively small population doses that might result from a highly improbable, successful attack on a dry storage system by terrorists. This evaluation confirmed that dry used fuel storage and transportation are among the safest of all industrial activities. As explained by the National Academy of Sciences, tens of thousands of tons of used fuel have been stored and shipped around the world in many thousands of storage and transportation packages, even traveling tens of millions of miles, without a radiation-induced injury or fatality. [78] Used fuel and radioactive material packagings have a unique characteristic among all other hazardous material packagings: the need for gamma-ray shielding. Gamma-shielding materials are dense and strong and must remain attached, even following accident conditions. This shielding provides enhanced robustness with larger structural safety margins than other packages.

The robustness of dry cask storage systems also addresses the concern that fuel becomes less self-protecting over time. This concern is expressed in both the proposed rule and draft GEIS, where the NRC discusses its intent to evaluate whether additional security requirements are warranted in

---

[75] *Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a US Mark I Boiling Water Reactor*, June 2013.

[76] *Id.* at vii.

[77] Draft GEIS Sections 4.19 and 5.19.

[78] National Academy of Sciences (NAS), National Research Council, 2005. "Safety and security of commercial used nuclear fuel storage: Public Report," Washington, DC: National Academies Press; National Academy of Sciences (NAS), National Research Council, 2006. "Going the distance? The safe transport of used nuclear fuel and high-level radioactive waste in the United States," Washington, DC, National Academies Press.

the future.[79] This discussion overstates the potential additional security risk that might accrue over time as the fuel becomes less radioactive. Industry believes that current practices would sufficiently protect even less radioactive fuel, making additional security requirements in the future unnecessary. While it is true that, as the fuel ages over time, it will become less radioactive and, hence, less self-protecting; a more significant factor is that the physical design of the individual storage systems will continue to provide a protective barrier and offer a robust security protection system relative to any terrorist attack. The concrete over-packs are in the range of 150 tons and the welded spent fuel canisters have individual weights in the range of 25 to 50 tons. Because of the physical size, special lifting and transport systems are needed to remove a full containment package. Successful individual system attacks or diversion of a specific fuel mass from storage systems would be problematic due to the bulk of the systems, layers of packaging, and fuel handling at the ISFSI even in the unlikely event that the containment boundary could be breached.

Extensive safety analyses and testing have been performed to conclude that casks in a licensed configuration will not release radioactive material under any credible accident conditions, and these analyses and testing have been accepted by the NRC in the package licensing process. Assumptions regarding cask "material failure," imposed by the application of conservative regulatory codes and standards, help to make a "no release" design possible. An example of conservatism in materials is stainless steel, a predominant material of choice for containment boundaries, which has about 2 orders of magnitude more energy absorption capability before failure than required by design codes. Many analyses of aircraft impacts, aviation fuel fires, aircraft attacks with explosives, and other highly improbable sabotage or accident occurrences rely on impact, thermal, or overpressure events to theorize damage. These analyses have shown that such events are very unlikely to result in dry storage or transport system containment breaches because of the robust design of the systems. This was summarized in the NAC presentation to the BRC of September 23, 2010.[80]

Despite this rugged design, the possibility of terrorists acquiring and using very sophisticated military weaponry to destroy used fuel storage or transport systems is often raised as a scenario that could result in grave population dose consequences. The probability, however, of successful deployment of such weapons must still be viewed as vanishingly small, since reasonable proximity to the storage systems and time-consuming, precise placement or delivery of such weapons must be accomplished. Over the last three decades, substantial testing and analyses have been performed to bound releases from used fuel casks following a perfect assault. Robert Luna[81] provides an excellent summary of this testing and offers an analysis of the likely respirable fission product release fractions from the used fuel system that are supported by testing. Luna has continued to research the release characteristics of used fuel storage and transport package sabotage events using military weaponry, and this research[82,83] may be used to establish a bounding population

[79] 78 Fed. Reg. 56776, 56795; GEIS Section 4.19.

[80], "Storage and Transportation of Used Fuel: Does Storage/Transportation System Hardening Enhance Safety and Security," Sept. 23, 2010.

[81] Luna, R.E., Yoshimura, H.R., Vigil, M.G., Philbin, J.S. Lange, F., Pretzsch, G., Koch, W. Cheng, Y.S., 2001. Perspectives on used fuel cask sabotage. Proceedings of the Waste Management '01 Symposium, Feb. 25 – Mar. 1, 2001, Tucson, Arizona.

Committed Effective Dose Equivalent (CEDE) for a credible sabotage event involving such packages.

The research reported by Luna shows that: 1) there is a large momentum transfer from the weapon penetrator to the used fuel towards the interior of the canister or cask; 2) used fuel, with its multiple layers of radically different densities, is a good medium for stopping high energy projectiles; and 3) the separated, individual used fuel storage cells made of steel in the basket of the canister or cask system tend to limit used fuel dispersion to the environment from all but the outer row of basket cells. When compared to an event like the accident at Chernobyl, a release from a storage or transport system would result in small quantities of used fuel ejected into the proximate environment and none injected into the high atmosphere. Therefore, using the Luna research on release fractions for a terrorist attack on a used fuel storage or transportation system, in combination with the Accident Dose Assessment and Projection Technique from Radionuclide Analysis at Chernobyl (ADAPTRAC) modeling described by Pennington to calculate maximum population exposures, [84,85] a bounding CEDE for a credible terrorist sabotage attack on a used fuel storage or transportation system can be calculated. This assessment is described by Pennington and is summarized below.[86]

> A high-capacity used fuel storage or transport system contains less than 0.06% of the radionuclides in the Chernobyl reactor core. ADAPTRAC modeling uses the reference[87] 50-year, post-accident dose distribution for the long-lived radionuclides released from the event, the half-lives of the radionuclides with significant dose participation, the total involved population, and the full application of all the long-lived radionuclide release, dispersal, and exposure pathway conditions that existed at Chernobyl. All the highly conservative Chernobyl conditions involving ejection into the upper atmosphere, a 40 day release period, wide dispersion, and the affected populations are retained in the ADAPTRAC model. For example, the first two plumes from the Chernobyl release continued for more than 36 hours, covering

---

[82] Luna, R.E., 2006. Release fractions from multi-element used fuel casks resulting from HEDD attack. Proceedings of the Waste Management '06 Symposium, Feb. 26 – Mar. 2, 2006, Tucson, Arizona.

[83] Luna, R.E., Yoshimura, R.H., Sorenson, K.B., 2007, Parametric study of the release of used fuel aerosol resulting from HEDD attack. Proceedings of the 15th International Symposium on the Packaging and Transportation of Radioactive Materials, PATRAM, 2007. Oct. 21–26, 2007, Miami, Florida.

[84] Pennington, C.W., 2010. A demonstration of the comparative radiological safety of commercial nuclear power generation in the USA. Int. J. Nuclear Governance, Economy and Ecology, Vol. 3, No. 1, pp.59–103.

[85] Pennington, C.W., 2010. Radiological safety of used fuel storage and transport. Proceedings of the 16th International Symposium on the Packaging and Transportation of Radioactive Materials, PATRAM, 2010. October 4 - 8, 2010, London, UK.

[86] Pennington, C.W., 2010. A demonstration of the comparative radiological safety of commercial nuclear power generation in the USA. Int. J. Nuclear Governance, Economy and Ecology, Vol. 3, No. 1, pp.59–103.

[87] United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), 2000. Report of the United Nations Scientific Committee on the Effects of Atomic Radiation to the General Assembly, Annex J: Exposures and effects of the Chernobyl accident. Vienna, Austria: United Nations Publications.

an area within a 5 km radius having a population density of almost 640 people/ km^2. However, for the 45° dispersion arc of these first two plumes, the effective population density within that 5 km distance and 45° arc was more the 5,000 people/ km^2. This population density is about two orders of magnitude higher than the population density surrounding U.S. nuclear dry storage facilities. The plume duration, combined with the very high population density within the early dispersion arcs, makes the Chernobyl dispersion characteristics very conservative for application of ADAPTRAC to [an] attack on a used fuel storage or transport system in the U.S.

The radionuclide release fractions applied in ADAPTRAC that result from [an] attack on a used fuel system are taken from Luna,[88,89] but are increased by a factor of 6 due to the assumption of using a very modern, used fuel storage or transportation system with a 100 psig pressurized canister for the used fuel, based on discussions with Mr. Luna regarding likely outcomes for such pressurized systems. The used fuel released and ejected from the system, mostly located in close proximity to the breached cask, would be in the range of several kilograms (kg), with longer-lived fission product radioactivity, including cesium-137 (137Cs), likely less than 10,000 curies (Ci) and in the range of 1,000 – 4,000 (Ci). Because there are low population densities around U.S. at-reactor dry used fuel storage facilities, the involved population would be much, much less than 500,000 people. For such a credible but low probability sabotage event, the population receiving significantly elevated doses would likely be site workers, and the peak 50-year total effective dose equivalent (TEDE) would be well under 1 cSv. Members of the public living around the dry storage facility that might receive a 50-year TEDE in the range of 1 - 3 mSv would number far less than 100,000. These doses and affected populations are well below those resulting from non-nuclear industries every year.

D. High Burnup Fuel

The GEIS appropriately addresses concerns being raised by staff about the integrity of high burnup fuel in storage as an example of the diligence in assuring long-term safety that is inherent in the regulatory process. The significant efforts that industry has already taken, and is continuing to take, to address these concerns should also be mentioned. Specifically, NEI's March 22 letter to NRC (*Industry Analysis and Confirmatory Information Gathering Program to Support the Long-Term Storage of High Burnup Fuel*, ML13084A045), information provided by Calvert Cliffs and Prairie Island in support of their ISFSI license renewal applications, and the joint DOE/EPRI High Burn-up Dry Storage Cask Research and Development Project (DOE Contract No.: DE-NE-0000593) should be referenced.

---

[88] Luna, R.E., 2006. Release fractions from multi-element used fuel casks resulting from HEDD attack. Proceedings of the Waste Management '06 Symposium, February 26 – March 2, 2006, Tucson, Arizona.

[89] Luna, R.E., Yoshimura, R.H., Sorenson, K.B., 2007. Parametric study of the release of used fuel aerosol resulting from HEDD attack. Proceedings of the 15th International Symposium on the Packaging and Transportation of Radioactive Materials, PATRAM, 2007. October 21 – 26, 2007, Miami, Florida.

The body of work contained in these references rules out gross degradation of high burnup fuel (HBF) cladding[90] and provides significant technical basis for the further evaluation of cladding performance over time. The DOE demonstration program is intended to gather confirmatory data on actual high burnup fuel in storage in support of this evaluation. Industry is committed to continually apply the results of ongoing scientific programs such as this to further assure the safety of high burnup fuel in storage and transportation, through aging management programs that support the renewal of storage system licenses. For example, in response to NRC questions asked as part of the license renewal process for the ISFSI at the Calvert Cliffs site, Constellation Energy outlined a two-pronged approach to long term storage of HBF. This approach consisted of an aging management program involving the aforementioned DOE demonstration program and documentation of the "substantial" safety margin that exists to assure "that fuel currently in storage is at low risk of suffering from the aging mechanisms associated with HBF during the additional time that will be required for the DOE program to conduct the first HBF inspection."[91]

E. Fukushima

NRC should add a discussion of the lessons learned from the March 2011 events at Fukushima Daiichi regarding the robustness of spent fuel in storage. Due to the fact that there were rumors about the condition of spent fuel at the Fukushima site during the event that later proved to be false, there is considerable misunderstanding on this topic. This continuing misunderstanding was evident in a number of statements made at the public meetings held during the comment period. On the day the earthquake and tsunami struck Japan, there were 10,149 spent fuel assemblies at the Daiichi site in seven pools and nine dry casks.[92] All of these pools were subject to the full force of the earthquake and three of them were inside buildings that were catastrophically damaged by hydrogen explosions associated with the reactor accidents. The dry casks were also over-washed by the tsunami. Yet, observations conducted since the accident consistently confirm that the stored spent fuel was largely unaffected by these occurrences and is still safely containing its radioactive inventory. The spent fuel that was of greatest concern during the accident, which was contained in the Unit 4 pool, remains in good condition and is suitable for handling using normal means. Accordingly, it is now being transferred out of the badly damaged building into another pool on site. The manner in which spent fuel withstood the effects of that tragic accident is perhaps the most dramatic evidence yet of the robust safety assurance provided by the spent fuel pool and dry cask storage.

---

[90] Electric Power Research Institute, *R&D Insights and Perspectives on Storage and Transportation of High Burnup Fuel*, Albert J. Machiels, presentation to RIC 2013, March 13, 2013.

[91] Calvert Cliffs Nuclear Plant, *Response to Request for Additional Information, RE: Calvert Cliffs Independent Spent Fuel Storage Installation License Renewal Application*, Material License No. SNM-2505, Docket 72-8, Letter Gellrich to NRC Document Control Desk, April 24, 2013.

[92] Tokyo Electric Power Company, *Operating Experience in Spent Fuel Storage Casks*, IAEA-CN-178/KN27 June 3, 2010.

F. Risk Analysis of Dry Cask Storage

NRC has appropriately cited NUREG-1864, its 2007 probabilistic risk assessment (PRA), in support of statements made about the low risk associated with dry cask storage. These statements could be further strengthened by also citing an independent PRA study conducted by EPRI (EPRI Document 1009691, dated Nov 2004), which also supports the conclusion that the risks are low. Industry agrees with NRC that the low risks calculated by these studies were confirmed during the Mineral, Virginia and Fukushima earthquakes, neither of which resulted in significant damage to dry cask storage systems or release of radionuclides.

G. Climate Change

During the public comment period, there were a number of concerns expressed about the possibility that climate change might cause spent fuel storage sites to experience conditions beyond those considered in the GEIS. Those concerns tended to focus on the effects of sea level rise at coastal sites. It should be noted that sea level rise, while widely documented, is not occurring at a rate that would compromise the ability of those who manage spent fuel storage facilities (ISFSIs) to continue to assure their safety. Even the most extreme scenarios postulated in recent climate studies indicate sea level rise will occur at a pace of less than 10 mm/year.[93] At this rate, ISFSI licensees will have ample opportunity to prepare and take necessary mitigative actions (including the movement of casks to higher ground, if necessary). Such measures will be addressed, as required by NRC regulations, in license renewal applications that will be submitted every 20 to 40 years for as long as the casks are in service.

H. Endangered Species Act

The distinction made between the short term storage impact of ISFSIs and Spent Fuel Pools on Special Status Species and Habitats should be clarified. Table 1 "Environmental Impacts of At-Reactor Continued Storage of Spent Nuclear Fuel,"[94] states that "ISFSI operations are not likely to adversely affect special status species and habitats," while indicating that "impacts from the spent fuel pool would be determined as part of Endangered Species Act Section 7 consultation." It is not immediately clear why short term storage in the pools would require consultation while ISFSI storage would not. NRC does explain in GEIS section 4.11.1 that the consultation in the pool case would be to consider the "parameters associated with the spent fuel cooling system," while also observing that the operation of only the spent fuel cooling system after plant shutdown would result in a "decrease in water withdrawal and discharge rates" from what had already been considered in the operating plant's Biological Opinion, and that impacts would "likely decrease." Therefore, the same statement that is made for ISFSI operations is actually also true for pool operations in that there would be no new "adverse" impacts due to short term storage. Table 1 should be revised to make the "not likely to adversely affect" statement equally applicable to pool and ISFSI storage. NRC could caveat the conclusion for pools by clarifying that the agency assumed that the continued

[93] Intergovernmental Panel on Climate Change, *Climate Change 2013: The Physical Science Basis*, Working Group I Contribution to the 5th Assessment Report of the Intergovernmental Panel on Climate Change, October 2013.

[94] 78 Fed. Reg. 56779, 56785-86.

operation of the spent fuel pool cooling system did not result in a "take" of a biological species not already covered in the operating reactor's Biological Opinion. Industry does, however, in general agree that the use of consultations would avoid and mitigate protected species impacts.

I. Historic and Cultural Resources

NEI disagrees with NRC's determination that impacts to historic and cultural resources in the long term and indefinite scenarios could be moderate or large. To the contrary, historic and cultural resources impacts can, and likely will, be avoided for all continued storage scenarios. During facility-specific licensing actions all requirements of the National Historic Preservation Act (NHPA), NEPA, and NRC regulations must be met, which provides further assurance that unavoidable impacts will be mitigated. The conclusion for all continued storage scenarios should be that cultural and historic impacts will be small. A detailed explanation in support of this conclusion is provided for each relevant GEIS section below.

Environmental Justice Sections: In the discussion of environmental justice impacts for at-reactor-long-term storage[95] and for indefinite at-reactor storage[96] there is inappropriate and unnecessary reference to the possibility of moderate or large impacts to historic and cultural resources. Although the correct overall conclusion regarding environmental justice impacts is reached, *i.e.*, small impacts in all cases, it should be recognized that for long-term or indefinite storage at decommissioned reactor sites there will be a large area of previously disturbed land that could be used for the storage facilities. A more reasonable assumption (that should be included in the historic and cultural resource sections) would be that the ISFSI can be sited to avoid significant historic and cultural resources, much like the appropriate assumption made for special status species and habitat in other sections of the GEIS. It should also be noted that the inappropriate and unnecessary references to potentially moderate/large historic and cultural resources is not included in the discussion of away-from-reactor environmental justice impacts for any phase of continued storage.

Historic and Cultural Resources Sections (At-Reactor Continued Storage): In the discussion of historic and cultural resources impacts for at-reactor, long-term[97] and indefinite storage[98] there is an inappropriate conclusion that moderate or large impacts to historic and cultural resources could result. It should be recognized that for long-term or indefinite storage at decommissioned reactor sites, there will be a large area of previously disturbed land that could be used for the construction of storage facilities and a DTS (if necessary). Therefore, an ISFSI or DTS can be sited to avoid significant historic and cultural resources. This assumption is similar to the assumptions made in other sections of the GEIS for special status species and habitat.

---

[95] GEIS, at Section 4.3.2, pp. 4-13.

[96] *Id.* at Section 4.3.3, pp. 4-14.

[97] *Id.* at Section 4.12.2, pp. 4-49 and 4-50.

[98] *Id.* at Section 4.12.3, pp. 4-50.

The conclusion that ISFSIs and DTS facilities can, and likely will, be sited in a manner that avoids moderate or large impacts on cultural resources is supported by the discussion in several sections of the GEIS, including:

- Section 4.12, page 4-48, lines 6-8, which states: "If adverse effects on historic properties are identified, appropriate mitigation can be developed through consultation with the State Historic Preservation Officer, tribal representatives, and other interested parties."

- Section 4.12.1, page 48, lines 31-33, which states: "[I]mpacts could be mitigated if the licensee has previously identified historic and cultural resources and has management plans and protective procedures in place."

- Section 4.12.2, page 4-49, lines 25 and 26, which states: "The replacement of the at-reactor ISFSI and initial and replacement DTS would require a site-specific environmental review and compliance with NHPA requirements before making a decision on the licensing action."

These statements support a reasonable assumption that licensees would avoid or mitigate any large or moderate impacts on cultural and historic resources resulting from construction of storage or DTS facilities. The NRC recognizes the inherent reasonableness of this assumption on pages 4-49 and 4-50 of the GEIS, which state:

> Given the minimal size of the replacement ISFSI and initial and replacement DTS, and the large land areas at nuclear power plant sites, licensees should be able to locate these facilities away from historic and cultural resources. Potential adverse effects on historic properties or impacts on historic and cultural resources could also be minimized through development of agreements, license conditions, and implementation of the licensee's historic and cultural resource management plans and procedures to protect known historic and cultural resources and address inadvertent discoveries during construction of the replacement at-reactor ISFSI and initial and replacement DTS.
>
> * * * * *
>
> If replacement activities occur in previously disturbed areas (i.e., in areas that have previously experienced construction impacts) then impacts on historic and cultural resources would be SMALL. Therefore, historic properties would not be adversely affected.

It is reasonable to assume that any new construction at a decommissioned nuclear power plant site would be on the large area of previously disturbed land. Thus, the NRC should conclude that the ISFSI and DTS (if there is one) can be sited to avoid significant historic and cultural resources, much like the appropriate assumption made for special status species and habitat made in other sections of the GEIS. In sum, the conclusion for at-reactor continued storage should be that cultural and historic impacts will be small for all timeframes.

Historic and Cultural Resources Sections (Away-From-Reactor Continued Storage): Like at-reactor continued storage, NEI believes that the impacts on cultural and historic resources for away-from-

reactor continued storage are properly characterized as small for all timeframes. This conclusion is supported by the discussion already provided in several sections of the GEIS, including:

- Section 5.12.1 (pages 5-34 and 5-35) provides a rationale explaining why any historic and cultural resources impacts would be minimal. Lines 18 and 19, p. 5-34 discuss how any ISFSI or DTS license would require NRC NEPA review and meet NHPA requirements. Lines 26 and 27 on p. 5-34 state, "Resolution of adverse effects, if any, should be concluded prior to the closure of the Section 106 process." Lines 12-26 on p. 5-35 list ". . . several factors [that] could avoid, minimize, or mitigate impacts."

- Section 5.12.2, Long-Term Storage (pages 5-36 and 5-37) makes much the same arguments for the avoidance or mitigation of impacts. Further, page 5-37 states:

> Given the large land area available around the ISFSI restricted area, the licensee should be able to locate the replacement facilities away from historic and cultural resources. Potential adverse effects on historic properties or impacts on historic and cultural resources could also be minimized through the development of agreements, license conditions, and implementation of the licensee's historic and cultural resource management plans and procedures to protect known historic and cultural resources and address inadvertent discoveries during construction of the replacement ISFSI and initial and replacement DTS.

- Section 5.12.3, which addresses indefinite storage, merely points to the discussion regarding long-term storage.

These passages reveal that the rationale for characterizing the impacts of away-from-reactor storage on historic and cultural resources as small for all timeframes is already provided in the GEIS. ISFSIs and DTS (if any are necessary) can be sited (or replaced) to avoid significant historic and cultural resources. This conclusion is analogous to the conclusions reached for special status species and habitat that are included in other sections of the GEIS. In sum, the conclusion for away-from-reactor continued storage should be that impacts on cultural and historic resources will be small for all timeframes.

J. The Role of Public Perception

"Public perception" costs and benefits should not be included in NRC's cost benefit analysis (Table 7-6, GEIS 7-15). As a legal matter, public perception is, we believe, too far removed from the physical environment to be an appropriate consideration in NEPA reviews. As the Supreme Court stated in *Metropolitan Edison Co. v. People Against Nuclear Energy*,[99] the operation of the facility is an event in the physical environment, but the alleged psychological health damage in that case was "too far removed from the event to be covered by NEPA." So too is "public perception."

Further, these costs are entirely speculative and fail to consider that different segments of the public have different perceptions. For example, NRC has concluded that there would be a public

[99] 460 U.S. 766, 7777 (1983).

perception benefit to site-specific review and a public perception cost to precluding such review. This assumption is likely to be correct for segments of the public opposing specific facilities, as a site-specific review provides an additional opportunity to voice this opposition. But among segments of the public concerned about the cost and availability of clean reliable electricity, the exact opposite would be true – *i.e.*, this segment of the public would not want the licensing of generating facilities they support to become protracted by unnecessary and duplicative environmental reviews. The dilemma then becomes: Which group's perception should be credited or assigned a given cost or benefit? If the answer to this question is to be that the perception held by the majority of the public should prevail, then NRC's decision to associate costs and benefits with the views of those who oppose nuclear power plants is most certainly incorrect. According to recent public opinion surveys a majority of the public favor nuclear power. For example, a survey conducted in September 2013 by Bisconti Research Inc. and Quest Global Research found 69 percent of the respondents now favor the use of nuclear energy as one of the ways to produce electricity. Such poll results have been consistent for a number of years.

Nonetheless, it is inappropriate for the NRC, an independent safety regulator, to base its cost-benefit analyses on the results of public opinion surveys or its perception of public opinion. Rather, it would be more appropriate for NRC to avoid attempting to quantify perception costs and benefits altogether. This would also be consistent with the conclusion reached by DOE in the Yucca Mountain FEIS that there was a consensus among social scientists that a quantitative assessment of the potential impacts from risk perceptions was "impossible at this time and probably unlikely even after extensive addition research."[100]

III. Proposed Rule Language and Associated "Conclusions"

In the rulemaking amending the TSR, 10 C.F.R. § 51.23, the NRC proposes new rule language and a new approach to summarizing its conclusions with respect to continued storage. NEI believes the NRC should clarify its approach to ensure that the essential elements of the traditional WCD Findings are preserved, either in the TSR, the Statements of Consideration (SOC), or as conclusions in the GEIS. NEI does not advocate retaining a separate WCD document containing Findings. Instead, the rule, the SOC, and the GEIS should consistently include the requisite determinations.

A. Background

As noted earlier, the NRC's first WCD and TSR resulted from a proceeding initiated after the Court of Appeals 1979 decision in *Minnesota v. NRC*.[101] That case involved petitions for review of NRC orders granting license amendments to permit expansion of onsite spent fuel storage capacity. The Court of Appeals remanded the matter to the NRC for consideration ". . . of the specific problem isolated by the petitioners determining whether there is reasonable assurance that an off-site storage solution will be available by . . . the expiration of the plants' operating licenses, and if not, whether there is reasonable assurance that the fuel can be stored safely at the sites beyond those dates."[102]

[100] DOE/EIS-250, Appendix N, page 21.

[101] 602 F.2d 412 (D.C. Cir. 1979).

[102] *Id*. at 418.

The Court of Appeals in *Minnesota v. NRC* recognized prior NRC "assurances of confidence" that a solution to the waste disposal issue would be found. It chose to inquire, by remand, into "the basis of those assurances of confidence."[103] The NRC's traditional WCD Findings responded to the remand in *Minnesota v. NRC*. In particular, Findings 1, 3, and 5 – which were not vacated and remanded in *New York v. NRC* – as updated in 2010, stated:

> Finding 1: The Commission finds reasonable assurance that safe disposal of high-level radioactive waste and spent fuel in a mined geologic repository is technically feasible.
>
> Finding 3: The Commission finds reasonable assurance that high-level waste and spent fuel will be managed in a safe manner until sufficient repository capacity is available to assure the safe disposal of all high-level waste and spent fuel.
>
> Finding 5: The Commission finds reasonable assurance that safe independent onsite spent fuel storage or offsite spent fuel storage will be made available as such storage capacity is needed.

Findings 2 and 4 – which were remanded in *New York v. NRC* to further address NEPA issues – involved, respectively, reasonable assurance that a repository will be available when necessary, and reasonable assurance that spent fuel can be stored safely and without significant environmental impacts for at least 60 years beyond the licensed life for plant operation. All five Findings were "reasonable assurance" findings.

The draft GEIS and supporting record is entirely consistent with Findings 1, 3, and 5. The draft GEIS clearly revises and appropriately supplements prior Findings 2 and 4 by including, for NEPA purposes, the "no repository" scenario, the long-term storage scenario, and further analyses of the environmental impacts of potential spent fuel pool leaks and fires. Findings 2 and 4 as previously drafted in the 2010 WCD remain valid. Therefore, the enhanced record of this rulemaking proceeding would clearly support continuation of all five WCD Findings for both AEA and NEPA purposes. At bottom, however, the key elements of Waste Confidence as required by *Minnesota v. NRC* and *New York v. NRC* are: (1) reasonable assurance that spent fuel can be safely stored until a permanent repository is made available, and (2) an assessment of the environmental impacts of interim spent fuel storage until a permanent repository is made available.

B. NRC's Proposed Rule and SOC Explanation

The proposed rule appropriately points to the GEIS for an assessment of the environmental impacts of continued spent fuel storage beyond the licensed life of a reactor. However, in lieu of the five prior WCD Findings, the SOC for the proposed rule, Section C ("Decision"), contains

[103] *Id*., at 419. The Court of Appeals referenced *NRDC v. NRC*, 582 F.2d 166 (2d Cir. 1978). In that case the Second Circuit had held that the Atomic Energy Act does not compel a determination that high-level waste can be permanently disposed of safely in order to permit licensing of new reactor projects. However, in that case the NRC had relied to some degree on its "confidence," or an "implied finding of reasonable assurance," that safe waste disposal would be available. 582 F.2d at 170.

"Conclusions" based on the draft GEIS and the assessment of spent fuel storage and disposal practices nationally and internationally. The Conclusions generally address the same issues as the five prior WCD Findings. The Conclusions relate to technical feasibility and availability of a geologic repository (see section III.C.2 of the SOC), and safety and environmental impacts of spent fuel storage during the three timeframes discussed above (see section III.C.3 of the SOC). While the use of "Conclusions" instead of "Findings" represents a departure from the prior WCD, the Conclusions are valid and well-supported based on the record in the GEIS.

NEI agrees with NRC's determination[104] that it is "feasible to safely store spent nuclear fuel following the licensed life for operation of a reactor" and to not limit the time to which this determination applies. The NRC has described the role that aging management programs and confirmatory studies play in supporting safe, long-term storage. NRC has commendably built the draft GEIS on the extensive work already done. More than 40 years of experience have produced a mountain of research and data on previous events that supports the conclusions in the draft GEIS. This research and data were produced by a variety of sources, including industry, government, academia, and international organizations. The conclusions that are reached in the draft GEIS are firmly based on the experience of decades of spent fuel storage already behind us. In fact, the probability of future events decreases for future storage systems because of actions and programs created and performed to prevent re-occurrence of the past events, as well as technological advances.

NRC has determined that it is feasible to have a repository "within 60 years following the licensed life for operation of a reactor."[105] This is strongly supported by international experience. Sweden, Finland, and France all expect to have operating repositories in the first quarter of this century.[106] The primary purpose of predicting a timeframe for repository availability is to provide a reasonable analytical timeline that ensures that all periods of continued storage are evaluated. NRC has done this. After the period of licensed operations (80 years for reactors), NRC segments the timeline for continued storage into three phases – 1) short term (between 0 and 60 years after licensed operations that have already been covered by operational NEPA analysis), 2) long-term (a period from 0 to 100 years after short-term), and 3) indefinite (a period that begins after long-term and can extend in 100-year cycles far into the future). Thus, the environmental impacts of continued storage, for any length of time, are appropriately analyzed.

NEI agrees with NRC's determination that the rule would not impose any requirements on industry or have any "cumulative effect." NRC correctly states, "Adoption of a revised 10 CFR 51.23, supported by this draft GEIS, is not a licensing action, and does not impose new requirements on licensees or applicants."[107] NRC's proposed action is to issue a revised rule, 10 CFR 51.23, that generically addresses the environmental impacts of continued storage. Whether or not the impacts

[104] Proposed 10 C.F.R. § 51.23(2)(i).

[105] Proposed 10 C.F.R. § 51.23(2)(ii).

[106] US Nuclear Waste Technical Review Board, *Experience Gained From Programs to Manage High-level Radioactive Waste and Spent Nuclear Fuel in the United States and Other Countries*, April 2011.

[107] Draft GEIS, Section 1.6.3.2, Implementing Additional Regulatory Requirements, pp. 1-9, lines 29-31.

are evaluated generically, in connection with a specific licensing action, or through some other alternative, the environmental effects remain the same. Because the proposed action is to make an administrative decision regarding how to evaluate environmental effects (*i.e.*, generic evaluation), there are no cumulative environmental effects of implementing the proposed action or any alternative. As stated in Section 1.6.4, Comparison of Reasonable Alternatives, p. 1-10, lines 10 and 11, "The alternatives merely propose alternative means of analyzing the environmental impacts of continued storage." NRC's efforts simply improve efficiency of the licensing process without instituting any new requirements on licensees.

The Conclusions in the SOC articulate that, based on operating experience, technical studies, and physical characteristics of spent fuel pools and dry cask storage systems: (1) a geologic repository is technically "feasible,"[108] (2) it is reasonable to assume the availability of a repository within 60 years beyond the licensed life of a reactor (*i.e.,* within the short-term timeframe),[109] and (3) a regulatory framework exists to support a conclusion that spent fuel can be safely stored for at least 60 years beyond a reactor's operating life (the short-term timeframe).[110] The NRC appropriately notes that past WCD updates found that a deep geologic repository is a technically feasible means of disposal, and that additional information since past WCD updates further support this conclusion. The NRC also cites the Blue Ribbon Commission Report, experience with Yucca Mountain, and international experience to support the 60-year timeframe for repository availability.

While the NRC's Conclusions are well-supported by the record and summarized in the draft GEIS, NEI believes that the essential aspects of the Conclusions and traditional WCD Findings could be reflected more fully in the rule itself to provide clarity to the public and to assure consistency with the past WCD Findings. Specifically, NEI recommends that the NRC adopt the rule language provided below because: (1) it more directly addresses the questions and issues identified in the foundational case law (*i.e.*, *Minnesota v. NRC* and *NRDC v. NRC*), and (2) it is more consistent with the agency's traditional WCD findings. NEI also believes that the Conclusions can be drafted in the SOC to better reflect the record and to be more consistent with the traditional WCD Findings.

The NRC's proposed rule language for 10 C.F.R. § 51.23(a) summarizes and streamlines the Conclusions into two statements:

- The GEIS addresses the environmental impacts of storage of spent nuclear fuel beyond the licensed operating life of a reactor; and

- It "is feasible" to safely store spent nuclear fuel following the license life for operations of a reactor and to have a mined geologic repository within 60 years following the licensed life for operation of a reactor.

[108] 78 *Fed. Reg.* at 56,793.

[109] *Id.* at 56,794.

[110] *Id.* at 56,796.

The NRC's proposal differs from the language in the 2010 TSR and WCD. The most notable difference is the Commission's conclusion that it is feasible to store spent fuel safely. Although the prior TSR also concluded that spent fuel can be stored safely, the prior WCD Finding stated that the Commission has reasonable assurance that spent fuel will be managed safely until sufficient geologic repository capacity is made available. Thus, the proposed rule and associated Conclusions do not express precisely the same determination regarding the safety of spent fuel storage as the prior rule and Findings. The prior rule and predictive Findings, based on "reasonable assurance," better reflect the showing suggested in *Minnesota v. NRC* and the discussion of the Commission's repository availability finding in *NRDC v. NRC*. These reasonable assurance findings are amply supported by the draft GEIS and SOC published with the proposed rule.

Additionally, the SOC and draft GEIS explain that the agency has already established criteria through its existing regulatory framework that provide reasonable assurance of public health and safety of continued spent fuel storage. However, NEI believes that the statement "regulatory oversight has been shown to enhance safety designs and operations"[111] represents a significant understatement of the basis for continued safe spent fuel storage. Regulatory oversight assures compliance with NRC's regulations, but compliance is only the minimal standard of safety. Industry's commitment to safe operations goes far beyond this and industry has consistently demonstrated a level of performance that not only meets, but exceeds regulatory requirements by a wide margin. Finally, in the area of dry storage it should be noted that, currently in the US, dry storage systems are manufactured by three highly competitive suppliers. This competition drives a continuous cycle of innovation which leads to technological advances that result in improved systems capable of providing ever increasing safety margins. We encourage the agency to further explain this Conclusion and reflect it in the SOC and rule, to ensure that the essential elements of the WCD Findings are adequately addressed.

C. NEI's Proposal for the Rule and SOC Explanation

NEI proposes that the rule be clarified to address the prior court decisions by including all necessary elements of the WCD Findings in the rule itself. This could be accomplished by making modest changes to the proposed rule language. Specifically, section 51.23(a) and (b) should be revised as follows[112]:

> (a) The Commission has developed a generic environmental impact statement (NUREG-2157) analyzing the environmental impacts of storage of spent nuclear fuel beyond the licensed life for operation of a reactor.
>
> (b) The Commission has reasonable assurance that: (i) sufficient mined geologic repository capacity to dispose of spent nuclear fuel generated in any reactor can be available when necessary, and (ii) spent nuclear fuel can be safely stored until that time.

[111] *Id* at 56,788.

[112] The entirety of 10 C.F.R. § 51.23 as suggested by NEI under this approach is set forth in Appendix A.

We recognize that this modified rule language would include non-environmental conclusions (regarding spent fuel storage and repository availability) in a Part 51 environmental regulation. However, this approach would more directly ensure that the agency satisfies the recent D.C. Circuit remand. First, the rule would acknowledge that the generic environmental impacts of continued spent fuel storage have been assessed in the GEIS. Second, the rule would explicitly reconfirm the agency's reasonable assurance that spent fuel can be managed safely (previously captured in WCD Findings 3, 4, and 5) and that a repository can be available when necessary (previously captured in the TSR and Finding 2). Reasonable assurance conclusions in the rule, rather than those related to feasibility, would update and replace the current Findings adopted after *Minnesota v. NRC*. Again, the inquiry in *Minnesota* was "whether there is reasonable assurance that an off-site storage solution will be available by the years 2007-2009…and if not, whether there is reasonable assurance that the fuel can be stored safely at the sites beyond those dates."[113] In addition, with respect to repository availability, the U.S. Court of Appeals for the Second Circuit described the NRC's finding as "an implied finding of reasonable assurance that safe permanent disposal of such wastes can be available when needed."[114]

NEI's modified language incorporates language from the 2010 TSR regarding the timeframe by which the Commission has reasonable assurance that a repository can be available. Although Waste Confidence case law does not require the Commission to put forth a timeframe for repository availability, the prior WCDs and TSRs have included a timeframe, which has guided the assessment of the safety and environmental impacts of continued spent fuel storage. NEI agrees with the Commission that it is reasonable to assume that a repository will be available within 60 years beyond a reactor's operating life. This assumption is well-supported in the record and should continue to be emphasized in the SOC and draft GEIS. However, given the societal and political uncertainties surrounding the establishment of a repository, NEI's suggested rule language expresses the Commission's reasonable assurance that a mined geologic repository can be available "when necessary." This approach would acknowledge the inherent nature of conclusions regarding repository availability: as the Court in *Minnesota v. NRC* stated, "…the ultimate determination can never rise above a prediction…"[115] It is also consistent with the description of the Commission's repository availability finding provided in *NRDC v. NRC* (see language quoted above).

Furthermore, continuing to find reasonable assurance that a repository will be available "when necessary" would not run afoul of the 2012 remand. Although the D.C. Circuit invalidated elements of the 2010 rule and WCD that relied on the "when necessary" timeframe, it did so on the basis that for NEPA purposes the agency had failed to adequately assess the environmental impacts of a failure to establish a repository. The agency has now fully met its NEPA obligations by assessing those impacts the draft GEIS, and can continue to find (based on its expert evaluation) that a repository will be available when necessary.

[113] *Minnesota v. NRC*, 602 F.2d at 418.

[114] *NRDC v. NRC*, 582 F.2d at 170.

[115] 602 F.2d at 417.

The SOC for the revised TSR should explain the basis for the rule, retaining much of the discussion in current Section C. It would make clear that the rule preserves and updates the previous WCD Findings – supplemented and supported by the GEIS. However, there would be no need to label them as specific "Findings" as done in the past. Additionally, the GEIS assesses the environmental impacts of interim spent fuel storage, including the issues remanded by the D.C. Circuit, and summarizes the record supporting the rule. Presenting all necessary elements in the rule would be the simplest and most straightforward approach. The SOC would explain the basis for the rule and include "Conclusions" (as it does now) that support the rule.

The SOC should continue to express reasonable assurance that safe disposal of high-level radioactive waste and spent nuclear fuel in a mined geologic repository is technically feasible. This conclusion tracks to prior Finding 1 and is supported by the prior WCDs. As stated in the SOC for the proposed rule, no new information challenges this conclusion. Although NEI's recommended rule language would state the Commission's reasonable assurance that a repository can be available "when necessary," the SOC (and draft GEIS) should continue to express the Commission's conclusion that it is reasonable to assume that a mined geologic repository will be available within 60 years beyond the licensed life for operating and planned new reactors.[116] This conclusion tracks to prior Finding 2 and is supported by international and national experience that the time period needed to develop a repository is approximately 25-35 years.

The SOC for the rule should also clearly articulate the basis for the Commission's conclusion of reasonable assurance that spent fuel can continue to be safely managed in spent fuel pools and dry casks until a geologic repository is available. This basis includes technical studies and industry experience to date. The SOC could additionally acknowledge – as it does currently – that regulatory oversight further ensures that aging management programs continue to be updated to address the monitoring and maintenance of structures, systems, and components that are important to safety. This conclusion tracks to prior Finding 3.

No specific conclusion in the SOC would be necessary for prior Finding 4 regarding the safety and environmental impacts of continued spent fuel storage, since those determinations would be captured in the rule itself. The rule language regarding continued safe storage of spent fuel would be supported by the other SOC conclusions, particularly the conclusion described immediately above (prior Finding 3).

Finally, the SOC should explicitly express the NRC's conclusion that it is reasonable to assume that safe independent onsite or offsite spent fuel storage will be made available if such storage capacity is needed. This conclusion tracks to prior Finding 5 and is based on the rationale in prior WCDs, such as the obligations under the Nuclear Waste Policy Act, NRC regulatory requirements, and the industry's commitment to continued safe storage pending disposal. The SOC's discussion of safe storage should continue to include the Commission's conclusion that spent nuclear fuel can be safely managed in spent fuel pools in the short-term timeframe and dry casks during the short-term,

[116] The record supports the Commission's belief that the availability of a geologic repository within this timeframe is very likely. However, as discussed above, given the societal and political uncertainties surrounding the establishment of a repository, the rule would express the Commission's reasonable assurance that a mined geologic repository can be available when necessary.

long-term, and indefinite timeframes evaluated in the draft GEIS. This conclusion is based on technical studies, operating experience, regulatory oversight, and the draft GEIS.

IV. Questions Posed in the Proposed Rule *Federal Register* Notice

A. Timeline for Repository Availability

Question: *Whether specific policy statements regarding the timeline for repository availability should be removed from the rule text.*

The revised rule text need not articulate specific timelines for repository availability in order to capture the Commission's essential finding that a repository can be available when necessary. NEI believes that a more general, "when necessary" finding is appropriate in the rule text. The robust discussion of specific timeframes for repository availability contained in the SOC and GEIS – including the Commission's conclusion that it is feasible to have a mined geologic repository within 60 years of licensed life for operation of a reactor – would support such a finding. Thus, NEI's proposed rule language provided above would not include a specific timeline for, or prediction regarding, repository availability.

There is no legal requirement that the rule include such a timeline or prediction. Nonetheless, the Commission's more specific predictive findings regarding repository availability should be maintained – whether in the SOC, the GEIS, or both – because such findings are useful in framing the agency's assessment of the safety and environmental impacts of continued spent fuel storage. Although the GEIS examines very long time periods, the Commission's specific conclusion regarding repository availability is that "a reasonable timeframe for repository availability is within 60 years beyond the licensed life for operation of a reactor."[117] The Commission also finds that it is "technically feasible to safely and securely store spent fuel in either wet or dry storage for *at least* 60 years beyond a reactor's licensed life for operation with only routine maintenance" and "that spent nuclear fuel can be safely managed in spent fuel pools in the short-term timeframe and dry casks during the short-term, long-term, and indefinite timeframes evaluated in the DGEIS."[118] So, the Commission's more specific predictive conclusions regarding repository availability (and the supporting analysis) provide both a basis for more general "when necessary" rule language, and context for more general safety conclusions regarding continued storage.

Thus, NEI's proposed rule language discussed above would continue to include "when necessary" as the timeframe for repository availability.

B. Policy Statements in the Rule Regarding Spent Fuel Storage

Question: *Whether specific policy statements regarding the safety of continued spent fuel storage should be made in the rule text given the expansive and detailed information in [the draft] GEIS?*

[117] 78 Fed. Reg. 56794.

[118] Id. at 56799 (emphasis added).

Specific statements capturing the Commission's conclusions regarding the safety of spent fuel storage during the continued storage period should be included in the rule text. This approach is simple and transparent; appropriately addresses the issues raised in *Minnesota v. NRC*, as well as *New York v. NRC*; and is consistent with the agency's long-standing approach to addressing continued storage. Thus, NEI's proposed rule language would include a specific policy statement regarding the safety of continued storage.

Although policy statements regarding the safety of continued spent fuel storage need not be included in the rule text *per se*, such statements (whether in a rule, a Finding, a Conclusion, or in a GEIS) are necessary to resolve issues raised in both *Minnesota v. NRC* and *New York v. NRC*. NEI believes that the rule should capture the essential finding, backed up by more specific Conclusions in the SOC, which are, in turn, consistent with the record summarized in the draft GEIS and prior WCD Findings. Although the GEIS includes comprehensive information regarding safe spent fuel storage, the GEIS itself is an environmental document assessing the environmental impacts of continued spent fuel storage. The GEIS supports conclusions regarding safe spent fuel storage, but its primary purpose is to satisfy the agency's environmental obligations under NEPA. To directly address the showing suggested in *Minnesota v. NRC*, NEI encourages the Commission to retain determinations regarding the safety of continued spent fuel storage in the rule, supported by similar "Conclusions" in the SOC.

C. Streamlining the Statements of Consideration

Question: *Whether it would improve clarity for NRC to streamline the statements of consideration and rule by removing the content that is merely repeated from the [draft] GEIS?*

NEI does not believe that streamlining of the statements of consideration and rule is necessary or advantageous. Summarizing the content in the SOC that is also contained in the GEIS will only enhance public understanding of the relationship between the GEIS and rulemaking package. The GEIS achieves a slightly different purpose than the prior WCD Findings. Therefore, it would be logical to address the traditional WCD Findings and the relevant information contained in the GEIS in either the rule or the SOC for the rule, rather than including that information only in the GEIS. The SOC should address the bases for the rule, including a discussion of the feasibility and reasonable assurance of safe spent fuel storage and repository availability.

D. Title of the Rule

Question: *Whether the title of the rule should be changed in light of a GEIS being issued instead of a separate Waste Confidence Decision?*

NEI supports changing the name of the rule and GEIS. We recommend the NRC to discontinue using "Waste Confidence" and "Temporary storage of spent fuel after cessation of reactor operation—generic determination of no significant environmental impact" and adopt a title that better describes the contents of the rule and GEIS. Moreover, by adopting a clearer title, the purpose and limited application of the rule will be more evident to members of the public who are not aware of the historical basis for the "Waste Confidence" term.

NEI supports a rule title such as the “Storage of Spent Nuclear Fuel After Licensed Term of Operation.” Similarly, the GEIS could be named the “Generic Environmental Impact Statement for the Storage of Spent Nuclear Fuel After Licensed Term of Operation.”

Appendix A: Suggested Modified Rule Language

§ 51.23 Storage of Spent Nuclear Fuel After Licensed Term of Operation.

(a) The Commission has developed a generic environmental impact statement (NUREG-2157) analyzing the environmental impacts of storage of spent nuclear fuel beyond the licensed life for operation of a reactor.

(b) The Commission has reasonable assurance that: (i) sufficient mined geologic repository capacity to dispose of spent nuclear fuel generated in any reactor can be available when necessary, and (ii) spent nuclear fuel can be safely stored until that time.

(c) As provided in §§ 51.30(b), 51.53, 51.61, 51.80(b), 51.95, and 51.97(a), and within the scope of the generic determinations in paragraph (a) of this section, no discussion of environmental impacts of spent nuclear fuel storage in reactor facility storage pool or an independent spent fuel storage installations (ISFSI) for the period following the term of the reactor operating license or amendment, reactor combined license or amendment, or ISFSI license, renewal, 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 power reactor under parts 50 and 54 of this chapter, or issuance or amendment of a combined license for a nuclear power reactor under parts 52 and 54 of this chapter, or the issuance of a license for storage of spent nuclear fuel at an ISFSI, or any amendment thereto.

The Statements of Consideration would set forth "Conclusions" similar to the traditional WCD Findings to explain the basis for the rule and to link the rule to the prior WCD Findings and the current GEIS.

Appendix B: Additional Comments

- Section 1.8.3, Analysis Assumptions, pp. 1-14 to 1-17, states various assumptions used in the GEIS analysis. In general the assumptions are made in an attempt not to underestimate environmental impacts. Industry does not disagree with this approach, but believes the GEIS should recognize this fact, either at the beginning of section 1.8.3 or explicitly in each stated assumption. Sometimes, but not in every case, the assumption already explicitly explains this conservatism. The GEIS should consistently recognize the reasonably conservative or bounding nature of many of the assumptions made for analysis purposes.

- GEIS section 1.8.6: NRC has eliminated greater-than-class-C LLW (GTCC) from consideration. Industry has considerable experience with the storage of GTCC after the operating life of a reactor. GTCC is currently stored in dry casks at ISFSIs on six shutdown reactor sites. Because of the possibility that GTCC may share a common disposal path with spent fuel, it would be useful if NRC, based on existing knowledge of the nature of GTCC, could conclude that the analysis and safety conclusions in this GEIS would apply equally to GTCC.

- GEIS section 1.8.6: NRC has eliminated reprocessing, advanced reactors, and non-power reactors from consideration. While we understand that full consideration of these impacts might be beyond the scope of this GEIS, it would be useful if NRC would add an explanation of how it would separately address these impacts, particularly with respect to any generic consideration that might be conducted.

- GEIS Section 2.1.1: Industry has reviewed the information provided in this section and has identified a number of instances where there appears to be some discrepancy between our data and what NRC has provided in this section. These discrepancies are identified below:

    - Page 2-6, line 23: The low end of the range for the number of fuel rods in a BWR assembly is stated to be 91. However, an 8x8 assembly (previously referred to in the same paragraph) would have only 64 fuel rods.

    - Page 2-7, Table 2-2: Industry data indicates that Haddam Neck has 1,101 fuel assemblies discharged. 82 are at Morris and 1019 in dry storage on site.

    - Page 2-7, lines 11-13.: There is a statement that fuel is removed from the reactor and replaced every 12-18 months. To our knowledge, only one reactor is currently operating on a 12-month cycle. NRC's statement should be changed to 18-24 months to represent nearly all reactors. For this reason the estimate of 20 MTU discharge per year is a slightly low. The 100 operating reactors discharge about 2240 per year on average. So, 22 MTU/yr is a more accurate number to use for a per-plant average. This would take the cited total of 1600 MTU per reactor over 80 years to 1,760.

    - Page 2-7, Lines 22-24: The statement regarding the 25% reduction in average MTU discharged annually (from 20 to 15) to reflect higher burnup fuel and longer cycles is not correct. There are many factors other than the length of the operating cycles

between refueling that affect the amount of used fuel discharged per year. Such factors include the generating capacity of each reactor and the percentage of time the reactor operates at full capacity. These factors are resulting in more power production over a shorter period of time than historical averages per reactor and cause more used fuel to be produced per year than in past operations – offsetting any reductions in fuel used because of longer operating cycles. Industry suggests removing this 15 MTU analysis and stating that higher burnup fuel may result in longer operating cycles, but a combination of other factors will result in about the same or slightly higher annual average MTU discharged per reactor. A better analytical assumption would be to use industry projections that show on average about 22 MTU per year will be discharged per reactor in the next six years.

- Page 2-10, line 22: The 2,000 MTU per year is slightly low. 2200 MTU/yr is based on industry data, which project about 2200 MTU/yr discharged by approximately100 reactors over the next six years.

- Page 2-14, lines 10-12: It might be useful to clarify that the 69 ISFSIs assigns two ISFSIs to PSEG (NRC considers Salem and Hope Creek separately) and includes PFS. It may be informative to explain that there are only 62 ISFSIs in operation. The difference is the dual-license ISFSIs at Robinson, Oconee, Surry, and North Anna; the INEL spent fuel facility that was never built; and Salem/Hope Creek, which is one ISFSI. Industry data indicates that, as of mid-2013, there are 1,771 casks in service at 53 General License ISFSIs (Salem and Hope Creek are one) and 14 Specific License ISFSIs (not including PFS).

- Page 2-14, lines 27-28: It is incorrect to say the NRC approval is sought for changes to the programs cited. Each of those programs is subject to a review of the proposed changes under 50.59, 50.54, or a license condition to determine whether prior NRC review and approval is required.

- Page 2-16, line 4 and Page 2-17, line 30: When stating that fuel will be transferred to an at-reactor or away-from-reactor ISFSI during decommissioning, NRC should recognize that decommissioned reactors may have the option of keeping their fuel in wet storage until DOE picks it up for either consolidated storage or disposal.

- Page 2-16, line 7: LaCrosse should be added to this list.

- Page 2-16, line 29: 1,600 will change if changes are made per earlier comment.

- Page 2-26, line 33: "loss of confinement" is not an "effect" being managed. It is a consequence of not managing the confinement boundary material condition properly. Industry recommends that this statement be changed to "cask and canister confinement boundary material condition."

- RULE, Discussion A.6, 56780 Col. 2: The statement that the rule covers MOX fuel because it is "substantially similar" to LWR fuel should be further supported by noting that DOE

considered MOX fuel in the Yucca Mountain FEIS analysis. The DOE analysis concluded that low-enriched uranium fuel and MOX were similar and environmental impact differences would be small. The GEIS should reference the Yucca Mountain FEIS in its conclusion (Yucca Mountain FEIS (DOE 2008), Appendix A, Section A.2.4.5.1.1, p. A-52).

- GEIS Sections 4.2 and 4.3: The worker estimates for wet storage and dry storage operations and maintenance appear reasonable, provided they include security (GEIS 4-7, lines 4-6). The logic for increasing the bottom of the range and decreasing the top of the range for dry storage versus wet is not clear. It seems the lower end of the range should be the same. On GEIS 4-11, line 27, the 15-85 should be 20-85 to be consistent with Section 4.2.1.

- GEIS Section 1.8.3: Page 1-17, states: "It is assumed that an ISFSI of sufficient size to hold all spent fuel generated will be constructed during the licensed life for operation." Industry disagrees with this assumption. There is no reason the full ISFSI needs to be constructed (or even designed) during the licensed life of the reactor. A few plants, like Harris, won't need an ISFSI built before the license ends if there is enough room in the pool for all of the fuel. And while the vast majority of plants will have an ISFSI constructed during their licensed life, they will still retain a significant quantity of fuel in the pools for at least the first few years after shutdown. An ISFSI can (and would likely) be expanded at an appropriate time after operations cease, which may be after the license life.

- RULE Discussion, C.3.a, 56795, Col. 3: NRC appropriately addresses concerns being raised by staff about Stress Corrosion Cracking (SCC) of dry storage canisters, citing the manner in which these concerns are being resolved as an example of how the regulatory process responds to changes and new information. The significant efforts that industry has already taken, and is continuing to take, to address this concern and assure the longevity of these canisters should also be mentioned. Specifically, actions being taken in accordance with Regulatory Issue Resolution Protocol N-10-01[119], information provided by Calvert Cliffs in support of their ISFSI license renewal application, and EPRI's comprehensive Failure Modes and Effects Analysis effort should be referenced.

- GEIS Section 4.3: The statement that "human health and environmental effects from continued storage would be small compared to the impacts that are normally experienced during reactor operations" (GEIS 4-11) is unnecessary and could potentially be interpreted to mean that reactors have large health effects – which, experience has shown, is not the case. It is sufficient to just conclude that these impacts would be SMALL without making any comparison to reactors.

- GEIS Section 2.1.4: NRC should clarify its position on the licensing of dry transfer and repackaging under 10 CFR Part 72 to address an apparent inconsistency between what is stated in the GEIS and other recent NRC documents. On GEIS 2-21 NRC refers to a dry transfer system and repackaging being licensed under Part 72 at Idaho National Lab (INL). Although Part 72 (72.2, Scope) does mention packaging, on August 23, the NMSS director

[119] "Regulatory Issue Resolution Protocol Screening Form and Resolution Plan for Chloride-Induced Stress Corrosion Cracking (RIRP-N-10-01)," Letter from R. McCullum (NEI) to D. Pstrack (NRC), May 31, 2013.

wrote a letter to the Commissioners stating that repackaging is not within the scope of Part 72.

- The assumption that ISFSIs would cause "some local atmospheric heating" (GEIS 4-15) based on a 1984 study (before there were any ISFSIs) appears to be without basis. Industry was unable to identify any instances in the 30 years of ISFSI operating experience since where any actual atmospheric temperature increase attributable to ISFSI operation has been documented. NRC should reconsider this statement.

- GEIS Section 4.10: The discussion of operating plant experience with impingement and entrainment appears to contain information that is not relevant (GEIS 4-36). We recommend that this discussion address only that information which is relevant to support the statement that these impacts are "bounded" by operating plants and "minor" as concluded on page 4-38 of the GEIS (e.g. the comparison of water requirements for a spent fuel pool vs. those for an operating reactor).

- GEIS Section 4.1.1: NRC has appropriately relied upon the precedent set by previously completed Environmental Assessments (EAs) to conclude that "continued operation of an at-reactor ISFSI is not anticipated to require new or additional maintenance activities that would affect current land use" (GEIS 4-4). Excerpts from the Trojan ISFSI Finding of No Significant Impact (FONSI) are provided below as an example.

    - ***Environmental Impacts of the Proposed Action:*** As discussed in the EA, no significant construction impacts are anticipated. Trojan ISFSI construction activities will affect only a small fraction of the land area of TNP. With good construction practices, the potential for fugitive dust, erosion, and noise, typical of the planned construction activities, can be controlled to insignificant levels. The only resources irretrievably committed are the steel, concrete, and other construction materials used in the ISFSI pad, storage casks, and any operating equipment. As discussed in the EA, there will be no radiological liquid or gaseous effluents during normal operation of the ISFSI. The estimated doses to both occupational workers and members of the public are below regulatory limits. As discussed in the EA, no significant radiological impacts are expected during operation of the ISFSI. The only environmental interface of the ISFSI is with the air surrounding the storage casks; the only discharge of waste to the environment is heated air from the cask's passive heat dissipation system. Climatological effects will be insignificant.

    - ***Finding of No Significant Impact:*** In summary, the TNP ISFSI is located in a small area within the confines of the TNP owner-controlled area and will require only a minor commitment of land resources. The proposed action is not expected to cause any significant release of effluents, and there will be no significant increases in individual and collective radiation doses to either the public or on-site workers. Potential offsite impacts from a postulated worst case credible accident are a small fraction of the regulatory limits of 10 CFR 72.106 and well below the U.S. Environmental Protection Agency's Protective Action Guides. Therefore, the proposed action will not significantly affect the quality of the human environment. Accordingly, pursuant to the requirements of 10 CFR 51.31 and 51.32, the

Commission has determined that a finding of no significant impact is appropriate and that an environmental impact statement need not be prepared for the issuance of a materials license for the Trojan ISFSI.

- GEIS Section 4.7.1.1: NRC has appropriately determined that "impacts on surface water consumptive use from the continued storage of spent fuel in spent fuel pools will not be detectible or be so minor that they would not be destabilizing." (GEIS 4-22). NRC's basis for this – that cooling water demand would be significantly reduced after reactor operations have ceased – is correct. As an example, data from the recently shut down Crystal River Unit 3 indicate that total raw water flow (circulating water plus service water) from the ultimate heat sink through the plant when it was operating was about 690,000 GPM. About 2,000 GPM (0.3%) of this water is used to cool spent fuel via the spent fuel pool heat exchangers.

- GEIS Section 5: NRC's evaluation of transportation impacts is sound and well supported by referenced reports and prior environmental studies all of which have been finalized after appropriate consideration of public comment.

- GEIS Section 3.15. With respect to the transportation environment (GEIS 3-37), the GEIS provides a reasonable description of the transportation region of influence. The GEIS concludes that non-radiation impacts from transportation for all scenarios are small to moderate with moderate impacts related to traffic and characteristics at a particular site. For radiological impacts (only the away from reactor scenarios and transport to a repository in the cumulative impacts section), the GEIS defers to generic findings in 10 CFR 51.52, Table S-4; several NRC analyses subsequent to Table S-4; and analysis done for Private Fuel Storage Facility. The conclusion in all cases is that radiological impacts would be small. NRC's treatment of this topic in the GEIS is appropriate and there is no basis to reconsider the determinations documented in Table S-4.