Rulemaking1CEm Resource

From: RulemakingComments Resource
Sent: Thursday, December 26, 2013 9:30 AM
To: Rulemaking1CEm Resource
Subject: FW: Docket ID No. NRC-2012-2012
Attachments: Docket ID No. NRC-2012-0246 CNL-13-151.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#: 00677

From: Edmondson, Carla [mailto:cedmondson@tva.gov]
Sent: Friday, December 20, 2013 3:57 PM
To: RulemakingComments Resource
Subject: Docket ID No. NRC-2012-2012

On behalf of

Joe Shea
Vice President, Nuclear Licensing

Carla Edmondson
Sr. Management Assistant
423-751-2638

Hearing Identifier: Secy_RuleMaking_comments_Public
Email Number: 703

Mail Envelope Properties (377CB97DD54F0F4FAAC7E9FD88BCA6D0014433C4A0DF)

Subject: FW: Docket ID No. NRC-2012-2012
Sent Date: 12/26/2013 9:29:40 AM
Received Date: 12/26/2013 9:29:48 AM
From: RulemakingComments Resource

Created By: RulemakingComments.Resource@nrc.gov

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

Post Office: HQCLSTR01.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	590	12/26/2013 9:29:48 AM
Docket ID No. NRC-2012-0246 CNL-13-151.pdf	4200918	

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

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-13-151

December 20, 2013

10 CFR 51.23

Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Email: Rulemaking.Comments@nrc.gov

ATTN: Rulemakings and Adjudications Staff

Subject: **Docket ID No. NRC-2012-0246, RIN 3150-AJ20**
Tennessee Valley Authority Comments on the Proposed Rule for "Waste Confidence—Continued Storage of Spent Nuclear Fuel," 78 Fed. Reg. 56,776, and the Draft Waste Confidence Generic Environmental Impact Statement, NUREG-2157

On September 13, 2013, the U.S. Nuclear Regulatory Commission ("NRC") published a proposed rule in the *Federal Register* (78 Fed. Reg. 56,776) regarding "Waste Confidence-Continued Storage of Spent Nuclear Fuel" ("Proposed Rule"). The Proposed Rule revises the NRC's generic determination on the environmental impacts of the continued storage of spent nuclear fuel beyond a reactor's licensed life for operation and prior to ultimate disposal. The NRC also prepared a Draft Generic Environmental Impact Statement ("DGEIS") to support the Proposed Rule. *See* NUREG-2157, Waste Confidence Generic Environmental Impact Statement, Draft Report for Comment (Sept. 2013). The NRC requested comments on both the Proposed Rule (78 Fed. Reg. at 56,776) and the DGEIS (NUREG-2157 at ii).

The Tennessee Valley Authority (TVA) respectfully submits the attached comments on the Proposed Rule and the DGEIS. In summary, TVA agrees with the Proposed Rule and the conclusions in the DGEIS that it is eminently feasible to safely store spent nuclear fuel beyond the licensed life for operation of a reactor and to have a mined geologic repository within 60 years following the licensed life for operation of a reactor. TVA further agrees with the conclusions in the DGEIS that the environmental impacts of continued at-reactor storage of spent fuel are generally small, including the impacts from spent fuel pool leaks and fires.

Additionally, TVA supports the comments submitted by the Nuclear Energy Institute on behalf of the nuclear power industry. In particular, TVA agrees that the NRC's use of a generic rulemaking to address the waste confidence issues is appropriate and consistent with applicable law, and the NRC has fully addressed the issues identified by the U.S. Court of Appeals for the District of Columbia Circuit in *New York v. NRC*.

Printed on recycled paper

Also, TVA provides comments that confirm that the NRC's general analysis of spent fuel storage impacts is fully applicable to TVA's nuclear plants, including Watts Bar Unit 2. In addition to support for NEI's comments and discussion of the applicability of the DGEIS analysis to TVA's plants, TVA provides comments for changes to the DGEIS, including recommendations for additional detail or topics in places to support the NRC's conclusions that environmental impacts are small and appropriately apply to all U.S. nuclear plants. TVA's comments demonstrate that there is no need for a site-specific Environmental Impact Statement for any TVA plant with a pending license application.

Finally, TVA notes that the NRC placed a high priority on the review and analysis of the rulemaking and that it was performed in an open and transparent manner appropriate for this issue. TVA urges the Commission to complete the rulemaking in a timely manner and on the original schedule. This action is vital to timely completion of ongoing licensing activities, including the pending operating license application for Watts Bar Unit 2.

TVA appreciates the opportunity to provide these comments on the Proposed Rule and the DGEIS. If any additional information is needed for the issues raised in this letter, please contact Gordon Arent at (423) 365-2004.

Respectfully,

Joseph W. Shea
Vice President - Nuclear Licensing

Enclosure:

Comments on Waste Confidence Rulemaking and Draft Generic Environmental Impact Statement

cc (Enclosure):

U. S. Nuclear Regulatory Commission
Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, Georgia 30303-1257

NRC Resident Inspector Unit 2
Watts Bar Nuclear Plant
1260 Nuclear Plant Road
Spring City, Tennessee 37381

ENCLOSURE

COMMENTS OF WASTE CONFIDENCE REULEMAKING

AND

DRAFT GENERIC ENVIRONMENTAL IMPACT STATEMENT

Tennessee Valley Authority Comments on the Proposed Waste Confidence Rule and the Draft Waste Confidence Generic Environmental Impact Statement

I. Introduction and Background

The Tennessee Valley Authority ("TVA") is a corporation owned by the U.S. Government that provides electricity for approximately 9 million people in parts of seven southeastern states. TVA's nuclear plants generate about 6,600 megawatts of electricity, providing about 30% of TVA's power supply. TVA owns and operates three nuclear plants: (1) Browns Ferry Nuclear Plant near Athens, Alabama; (2) Sequoyah Nuclear Plant in Soddy-Daisy, Tennessee; and (3) Watts Bar Nuclear Plant ("WBN") near Spring City, Tennessee.[1] Although these comments generally apply to all of TVA's plants, TVA provides additional information on WBN given the pending operating license action for WBN Unit 2 ("WBN-2").[2]

WBN Unit 1 ("WBN-1") began commercial operation in 1996. Although construction on WBN-2 began in 1973, TVA later suspended that construction. In 2006, TVA began a detailed study, including a thorough environmental review, of possible completion of WBN-2. The TVA Board subsequently approved completion of construction of WBN-2, and construction resumed in 2008. TVA submitted an updated application for the WBN-2 operating license to the U.S. Nuclear Regulatory Commission ("NRC") in 2009, which remains under review at this time.[3]

During the NRC's ongoing review of the WBN-2 operating license application, the U.S. Court of Appeals for the District of Columbia Circuit issued a decision vacating and remanding certain aspects of the 2010 update to the NRC's Waste Confidence Decision and Temporary Storage Rule (10 CFR 51.23), as contrary to the National Environmental Policy Act ("NEPA").[4]

The NRC published a Proposed Rule in the *Federal Register* on September 13, 2013 in response to the D.C. Circuit decision.[5] The Proposed Rule revises the NRC's generic determination on the environmental impacts of the continued storage of spent nuclear fuel ("SNF" or "spent fuel") beyond a reactor's licensed life for operation and prior to ultimate

---

1 General information about TVA's nuclear plants is provided on TVA's website. *See* TVA Website, Nuclear Energy, http://www.tva.com/power/nuclear/index.htm.

2 In July 2013, the Atomic Safety and Licensing Board dispositioned the final admitted contention in the WBN-2 operating license proceeding. *See* Order (Granting Motion to Withdraw Contention 7) (July 17, 2013). A proposed contention related to waste confidence issues that was based on the D.C. Circuit's decision in *New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012), remains held in abeyance by the Commission. *See Calvert Cliffs Nuclear Project, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-12-16, 76 NRC __, slip op. at 4-6 (Aug. 7, 2012). Thus, there are no admitted contentions that must be resolved prior to the issuance of the operating license.

3 *See* TVA Website, Nuclear Energy, Watts Bar Unit 2, http://www.tva.com/power/nuclear/wattsbar_unit2.htm .

4 *New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012). A more detailed history of this decision is described in the NRC's Proposed Rule. *See* Proposed Rule, Waste Confidence—Continued Storage of Spent Nuclear Fuel, 78 Fed. Reg. 56,776, 56,779 (Sept. 13, 2013) ("Proposed Rule").

5 Proposed Rule, 78 Fed. Reg. at 56,776.

disposal. The NRC also prepared a Draft Generic Environmental Impact Statement ("DGEIS") to support the Proposed Rule.[6]

The Proposed Rule would revise 10 CFR 51.23 as follows:

> (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. The Commission has concluded the following:
>
> (1) The analysis in NUREG–2157 generically addresses the environmental impacts of storage of spent nuclear fuel beyond the licensed life for operation of a reactor; and
>
> (2) The analysis in NUREG–2157 supports the Commission's determinations that it is feasible to:
>
> (i) Safely store spent nuclear fuel following the licensed life for operation of a reactor and
>
> (ii) have a mined geologic repository within 60 years following the licensed life for operation of a reactor.[7]

Based on these conclusions, the NEPA analyses for future reactor and spent fuel storage facility licensing actions would not need to consider the environmental impacts of continued storage of spent fuel on a site-specific basis.[8]

TVA notes the substantial effort of the NRC Staff and Commission on the Proposed Rule and DGEIS and provides these comments. TVA's comments focus on the environmental impacts of continued storage of SNF at TVA's nuclear plants generally, but also include additional discussion and examples of the small environmental impacts associated with continued storage of spent fuel at WBN-2.

In summary, the Proposed Rule states that the Commission has determined that it is feasible to safely store SNF following the licensed life for operation of a reactor, either in spent fuel pools ("SFPs") or dry casks, and to have a mined geologic repository within 60 years following the licensed life for operation of a reactor. The Proposed Rule is supported by the conclusions in the DGEIS that most of the environmental impacts of continued at-reactor storage of spent fuel in a SFP or Independent Spent Fuel Storage Installation ("ISFSI") are small.[9] TVA agrees with and fully supports these conclusions and the NRC's supporting explanation. As the NRC correctly concludes:

- Reactor licensees, including TVA, continue to develop and successfully use onsite SNF storage capacity in the form of SFPs and dry cask storage in a safe and environmentally sound fashion. Substantial technical understanding and decades of experience demonstrate the technical feasibility of safe storage of spent fuel in SFPs and in dry casks, based on their robust physical integrity over long periods of time.[10]

---

6 *See* NUREG-2157, Waste Confidence Generic Environmental Impact Statement, Draft Report for Comment (Sept. 2013) ("DGEIS").

7 Proposed Rule, 78 Fed. Reg. at 56,804.

8 *Id.* at 56,776.

9 *See* DGEIS at 4-90.

10 *See* Proposed Rule, 78 Fed. Reg. at 56,799.

- The storage of SNF in any combination of SFPs or dry casks will continue as a licensed activity under regulatory controls and oversight. Regulatory oversight continues to enhance the safety of both wet and dry spent fuel storage as concerns and information evolve over time. For example, events such as the September 11, 2001 terrorist attacks and the March 2011 Fukushima Dai-ichi accident have led to numerous security and safety enhancements.[11]

- Safe and environmentally-sound spent fuel storage would continue, if necessary, beyond 60 years after the end of the reactor's licensed operating life under an NRC-approved aging management program to ensure that monitoring and maintenance are adequately performed. The DGEIS assumes that, at an appropriate time, ISFSI structures, systems, and components ("SSCs") would be replaced as part of an approved aging management program. Continued experience with storing spent fuel will guide and inform aging management plans.[12]

Additionally, as discussed in Section II below, TVA fully supports the comments of the Nuclear Energy Institute ("NEI") that were submitted on behalf of the U.S. nuclear power industry. In particular, TVA agrees that the NRC's use of a generic rulemaking is appropriate; the NRC's rulemaking process has fostered considerable transparency and public participation; the Proposed Rule and the DGEIS specifically address the issues identified by the D.C. Circuit as requiring further evaluation in an Environmental Impact Statement ("EIS"); and the Proposed Rule and DGEIS consider appropriate timeframes for continued SNF storage. NEI's comments demonstrate that the NRC should proceed with timely issuance of the Final Rule.

As discussed in Section III below, the NRC's generic analysis of spent fuel storage impacts is fully applicable to TVA's nuclear plants, including WBN-2. This includes consideration of the DGEIS assumptions, such as the reference facility described in Chapter 2; the affected environment in Chapter 3; consideration of the environmental impacts in Chapter 4; consideration of continued safe storage of spent fuel in Appendix B; consideration of SFP leaks in Appendix E; and consideration of SFP fires in Appendix F. Finally, in Section IV below, TVA provides certain suggestions to further enhance the analyses and information in the DGEIS and Proposed Rule.

II. TVA Fully Supports the Industry's Comments on the Proposed Rule and DGEIS

NEI has prepared detailed comments on the Proposed Rule and DGEIS on behalf of the nuclear power industry.[13] TVA fully concurs in NEI's observations and recommendations. TVA discusses a few of the key comments below.

A. The NRC's Use of Generic Rulemaking Is Appropriate and Complies with NEPA

The Proposed Rule is a generic determination regarding the potential environmental impacts from the continued storage of SNF after the end of a reactor's licensed life for operation and before the SNF is placed in a repository.[14] The NRC explained in the Proposed Rule that

---

11 *Id.* at 56,788.

12 *Id.* at 56,788-789.

13 NEI Comments on Proposed Waste Confidence Rule and Generic Environmental Impact Statement (Dec. 20, 2013) ("NEI Comments").

14 Proposed Rule, 78 Fed. Reg. at 56,776.

addressing the environmental impacts of continued storage generically "will enhance the NRC's efficiency in individual licensing reviews by addressing a set of issues that are the same or largely similar or can be reasonably predicted."[15] Similarly, NEI commented that the use of a generic approach to evaluating waste confidence issues will obviate duplicative and inefficient site-specific reviews and is consistent with long-standing agency practice and judicial precedent.[16] TVA fully agrees with the NRC's and NEI's conclusions that a generic approach is appropriate. TVA's conclusions are supported by the following:

- As the NRC correctly notes, the impacts of continued storage of spent fuel can be assessed generically because: (1) continued storage will involve SNF storage facilities for which the environmental impacts of operation are sufficiently understood as a result of lessons learned and knowledge gained from decades of operating experience (including the use of common storage technologies); (2) activities associated with continued storage are expected to be within this well-understood range of operating experience and, thus, environmental impacts can be reasonably predicted; and (3) changes in the environment around SNF storage facilities, including those existing or planned for WBN, are sufficiently gradual and predictable to be addressed generically.[17]

- The advantage of a generic rulemaking in these circumstances is clear and well-established, and expressly stated in the Proposed Rule: to enhance efficiency in individual licensing reviews by comprehensively analyzing environmental impacts that are the same or largely similar for each nuclear power reactor or storage site, thereby avoiding the need to "repeat the identical or substantially similar analysis in individual licensing actions."[18] This is consistent with the Commission's longstanding practice to address long-term waste storage issues generically by rulemaking rather than on a case-by-case adjudicatory basis.[19]

- Use of a generic rulemaking also has been sanctioned by the federal courts, including the D.C. Circuit in *New York v. NRC*,[20] and avoids the obvious inefficiencies attendant to case-by-case adjudication of fundamentally generic environmental issues. The D.C. Circuit stated: "Both the Supreme Court and this court have endorsed the Commission's longstanding practice of considering environmental issues through general rulemaking in appropriate circumstances" and "we see no reason that a comprehensive general analysis would be insufficient to examine on-site risks that are essentially common to all plants."[21] The NRC has not identified any impacts that call into question this practice for continuing storage of SNF.

---

15 *Id.* at 56,780.

16 *See* NEI Comments.

17 Proposed Rule, 78 Fed. Reg. at 56,781.

18 *Id.* at 56,784.

19 *See Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 & 3), CLI-10-19, 72 NRC 98, 99-100 (2010) (citing *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 343 (1999); *Kelley v. Selin*, 42 F.3d 1501, 1512-13 (6th Cir. 1995)) (directing denial of the admission of waste confidence contentions that were the subject of general rulemaking).

20 *See New York*, 681 F.3d at 480; *see also Baltimore Gas & Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 101 (1983) ("The generic method chosen by the agency is clearly an appropriate method of conducting the hard look required by NEPA."); *Minnesota v. NRC*, 602 F.2d 412, 416-17 (D.C. Cir. 1979).

21 *New York*, 681 F.3d at 480.

- The following statement by the Commission in the *Oconee* license renewal proceeding provides a good summary of the Commission's views about generic treatment of high-level waste disposal issues:

> The Commission sensibly has chosen to address high-level waste disposal generically rather than unnecessarily to revisit the same waste disposal questions, license-by-license, when reviewing individual applications. High-level waste storage and disposal, we have said, "is a national problem of essentially the same degree of complexity and uncertainty for every renewal application and it would not be useful to have a repetitive reconsideration of the matter." 61 Fed. Reg. 66,537, 66,538 (Dec. 11, 1996).[22]

- As discussed further below, TVA has confirmed that the conclusions in the DGEIS regarding the small environmental impacts of continued storage of SNF apply to TVA's plants, including WBN. Thus, there is no need for or benefit of a site-specific analysis for issuance of an operating license for WBN-2 or other pending or future TVA licensing actions.

In summary, the use of a generic rulemaking and a generic EIS is entirely appropriate for the waste confidence issues under consideration in the Proposed Rule and DGEIS, and has been justified by the NRC.

B. The NRC's Rulemaking Process Has Complied with NEPA and Fostered Considerable Transparency and Public Participation

TVA also agrees that the NRC's waste confidence rulemaking process fully satisfies NEPA in that it has included considerable transparency and public participation. As NEI notes, the process has been a model of transparency in agency action.[23] The NRC has afforded all stakeholders numerous and timely opportunities to participate directly in the rulemaking process. For example, the NRC has held numerous meetings, conferences, and workshops to inform the public about the rulemaking and to solicit input, including comments on the Proposed Rule.

Some specific examples of transparency and public participation are provided below:

- On October 25, 2012, the NRC published a notice in the *Federal Register* announcing its intent to conduct a NEPA "scoping process" in support of the planned GEIS that would accompany its updated Waste Confidence Rule.[24] The NRC held public meetings and webinars in late 2012 as part of the scoping process. The notice established a January 2, 2013 deadline for the submittal of public comments on the scope of the waste

---

22 *Oconee*, CLI-99-11, 49 NRC at 345 (emphasis added); *see also Indian Point*, CLI-10-19, 72 NRC at 100.

23 NEI Comments.

24 Proposed Rule, Consideration of Environmental Impacts of Temporary Storage of Spent Fuel After Cessation of Reactor Operation, 77 Fed. Reg. 65,137 (Oct. 25, 2012).

confidence environmental review.[25] The NRC Staff issued its GEIS Scoping Summary Report on March 5, 2013.[26]

- Many groups participated in the scoping process and submitted comments.[27] As documented in the GEIS Scoping Summary Report, the NRC received and considered those comments as required by NEPA.[28]

- On June 7, 2013, the Staff issued SECY-13-0061, in which it requested Commission approval of a Proposed Rule that would revise the generic determination on the environmental impacts of continued storage of SNF.[29] In SRM-SECY-13-0061, issued on August 5, 2013, the Commission approved issuance of the Proposed Rule in the *Federal Register*, subject to the Staff's inclusion of certain modifications specified in the SRM.[30] Thus, the NRC provided drafts of the Proposed Rule and DGEIS well in advance of the formal comment period, thereby allowing substantially more time for public review of the documents.

- The NRC published the Proposed Rule in the *Federal Register* on September 13, 2013,[31] and subsequently extended the time for public comment from November 27, 2013 to December 20, 2013 due to the government shutdown.[32] Thus, the NRC provided almost an entire month extension to the comment period based on a much shorter duration NRC shutdown. In total, the draft Proposed Rule and DGEIS have been available for over six months since issuance of SECY-13-0061.

---

25 *Id.*

26 Waste Confidence Generic Environmental Impact Statement Scoping Process Summary Report (Mar. 2013) ("GEIS Scoping Summary Report"), *available at* ADAMS Accession No. ML13060A128.

27 Comments by Alliance for Nuclear Accountability, Beyond Nuclear, Blue Ridge Environmental Defense League, Center for a Sustainable Coast, Citizens Allied for Safe Energy, Citizens Environmental Alliance, Don't Waste Michigan, Ecology Party of Florida, Friends of the Earth, Georgia Women's Action for New Directions, Hudson River Sloop Clearwater, Missouri Coalition for the Environment, NC WARN, Nevada Nuclear Waste Task Force, New England Coalition, Nuclear Information and Resource Service, Nuclear Watch South, Physicians for Social Responsibility, Public Citizen, Riverkeeper, San Luis Obispo Mothers for Peace, SEED Coalition, Sierra Club Nuclear Free Campaign, and Southern Alliance for Clean Energy on Scope of Waste Confidence Environmental Impact Statement (Jan. 2, 2013) ("Scoping comments"), *available at* ADAMS Accession No. ML13007A441.

28 GEIS Scoping Summary Report at 15-51, 55, 59. The DGEIS also considered those scoping comments. For example, the DGEIS appropriately addresses a number of different comments, including additional recommendations pertaining to spent fuel storage (*e.g.*, special hardened onsite storage, reducing SFP density, and accelerating the transfer of spent fuel from pools to dry casks). *See* DGEIS at xxvi.

29 SECY-13-0061, Proposed Rule: Waste Confidence – Continued Storage of Spent Nuclear Fuel (RIN 3150-AJ20) (June 7, 2013).

30 Staff Requirements – SRM-SECY-13-061 – Proposed Rule: Waste Confidence – Continued Storage of Spent Nuclear Fuel (RIN 3150-AJ20) at 1-2 (Aug. 5, 2013).

31 Proposed Rule, 78 Fed. Reg. at 56,776.

32 Proposed Rule, Waste Confidence—Continued Storage of Spent Nuclear Fuel, 78 Fed. Reg. 66,858, 66,858 (Nov. 7, 2013).

- The NRC has held 13 public meetings (one of which was only a public teleconference) at a wide range of geographic locations to receive comments on the Proposed Rule and DGEIS.[33] Two of the meetings have included teleconference capability to ensure the widest possible participation by the public.[34] The NRC transcribed the public meetings and stated that it would consider statements at the meeting as comments on the Proposed Rule and DGEIS. For example, the NRC transcribed a November 4, 2013 public meeting in Charlotte, North Carolina, that included comments specific to TVA.[35]

In summary, the NRC has conducted the waste confidence rulemaking in accordance with NEPA requirements in an open and transparent manner and with numerous opportunities for public involvement.

C. The Proposed Rule and DGEIS Specifically Address the Issues Identified by the D.C. Circuit as Requiring Further Evaluation in an EIS

The Proposed Rule and the supporting DGEIS directly address the three deficiencies identified by the D.C. Circuit in its remand order,[36] and do so in a manner that thoroughly and reasonably address the environmental impacts of continued storage of SNF for all reactors—including those at TVA's plants.[37]

With regard to the first issue identified by the court (the impacts of failure to secure permanent government disposal),[38] the DGEIS analyzes the impacts of three timeframes that represent various scenarios for the length of time for which continued spent fuel storage may be required.[39] In particular, the "indefinite" timeframe assumes, for analysis purposes, that a repository never becomes available, and that spent fuel must be stored indefinitely in either at-reactor or away-from reactor storage facilities.[40] As discussed below, this is a highly conservative and unlikely scenario. Nonetheless, the NRC evaluated the indefinite storage scenario to "fully cover any likely environmental impacts associated with continued storage" and in direct response to the D.C. Circuit's recent ruling.[41] As stated in the DGEIS,

---

33 *See* Public Involvement in Waste Confidence, http://www.nrc.gov/waste/spent-fuel-storage/wcd/pub-involve.html#schedule (last visited Dec. 14, 2013).

34 *See id.*

35 Transcript of November 4, 2013 Charlotte Waste Confidence Public Meeting ("Charlotte Meeting Transcript"), *available at* ADAMS Accession No. ML13323B474.

36 *New York*, 681 F.3d at 478-79.

37 *See* Proposed Rule, 78 Fed. Reg. at 56,780 ("[T]he Commission instructed NRC staff to proceed with a generic EIS to analyze the environmental impacts of continued storage and address the issues raised in the Court's decision and to update the Waste Confidence rule in accordance with the analysis in the EIS. The DGEIS and the proposed rule implement the Commission's direction."); *id.* at 56,784 ("The analysis in the GEIS constitutes a regulatory basis for the proposed rule at 10 CFR 51.23, which codifies the NRC's conclusions in the GEIS on the environmental impacts of continued storage, including the Commission's expectations on the availability of a geologic repository.").

38 *See New York*, 681 F.3d at 477-79.

39 *See* Proposed Rule, 78 Fed. Reg. at 56,784, 56,789.

40 *See id.*

41 *See id.* at 56,785; *see also id.* at 56,779 ("[T]he Court held that the Commission needed to include an evaluation of the environmental effects of failing to secure permanent disposal since there was a degree of uncertainty regarding whether a repository would be built.").

"[f]or most of the resource areas, the impact determinations for all three timeframes are SMALL."[42] There is nothing unique or different at TVA's plants that calls into question the applicability of these impact determinations.

With regard to the second issue cited by the court (probability and consequences of future SFP leaks),[43] DGEIS Appendix E analyzes the potential offsite impacts of SFP leaks to groundwater, surface water, soils, and public health during the short-term storage timeframe. Consistent with decades of operating experience and environmental monitoring, including TVA's own operating experience, that analysis concludes that the impacts are SMALL.[44] As discussed below, the SMALL finding regarding the potential offsite impacts of SFP leaks applies to potential impacts at TVA's plants.

Finally, to address the court's third area of concern (the probability and consequences of SFP fires),[45] the DGEIS contains a detailed analysis of SFP fires, and concludes that the probability-weighted impacts (*i.e.*, overall risk) of SFP fires during the short-term storage timeframe is SMALL for all plants.[46] Also as discussed below, the SMALL finding regarding the risk of SFP fires applies to potential impacts at TVA's plants. But as discussed further in Section III.H below, the NRC's analysis is highly conservative, particularly given that the risk diminishes greatly during the first few months after shutdown; thus, minimal or negligible risk exists for the remaining post-shutdown period.

In summary, the NRC has taken reasonable and appropriate actions, in the form of the DGEIS and a proposed generically-applicable rule, to address the deficiencies in 10 CFR 51.23 identified by the D.C. Circuit.

D. The Proposed Rule and DGEIS Consider Appropriate Timeframes for Continued SNF Storage

The Proposed Rule and DGEIS analyze the impacts of three timeframes that represent various conservative scenarios for the length of continued SNF storage that may be required.

- The *short-term* timeframe analyzes 60 years of continued storage after the end of a reactor's licensed operating life. Short-term storage of SNF includes: (1) continued storage in SFPs (at-reactor only) and ISFSIs; (2) routine maintenance of SFPs and ISFSIs (*e.g.*, maintenance of concrete pads); and (3) handling and transfer of spent fuel from SFPs to ISFSIs (all SNF is assumed to be removed from the SFP by the end of the short-term period).[47] The assumptions within the short-term timeframe are reasonable for TVA's nuclear plants, including WBN.

---

42 DGEIS at 4-90.

43 *See New York*, 681 F.3d at 479-81.

44 *See* Proposed Rule, 78 Fed. Reg. at 56,797; DGEIS at E-19.

45 *See New York*, 681 F.3d at 479-82.

46 *See* DGEIS at F-12. As discussed in DGEIS Section 1.8, the NRC assumes that all spent fuel is removed from the pools and placed in dry-cask storage by the end of the short-term storage timeframe. Appendix F, therefore, does not analyze the impacts of SFP fires after the short-term storage timeframe because a SFP will not be used to store spent fuel after that time.

47 Proposed Rule, 78 Fed. Reg. at 56,784.

- The *long-term* timeframe considers the environmental impacts of continued SNF storage for a total of 160 years after the end of a reactor's licensed life for operation. The DGEIS assumes that *all* spent fuel has been transferred from the SFP to an ISFSI by the end of the short-term timeframe. Long-term storage activities include: (1) continued storage of spent fuel in ISFSIs, including routine maintenance; (2) one-time replacement of ISFSIs and spent fuel canisters and casks; and (3) construction, operation, and one replacement of a dry transfer system ("DTS") facility.[48] The assumptions within the long-term timeframe are also reasonable or conservative for TVA's nuclear plants, including WBN.

- The *indefinite* timeframe analyzed in the DGEIS assumes that a repository never becomes available. During this timeframe, the DGEIS assumes: (1) continued storage of spent fuel in ISFSIs including routine maintenance; (2) replacement of ISFSIs and spent fuel canisters every 100 years; and (3) construction and operation of a DTS, including replacement every 100 years.[49] These assumptions also are reasonable or conservative for TVA's nuclear plants, including WBN.

While NRC's analyses of the three timeframes are thorough and supported by substantial evidence, TVA agrees with the NRC[50] and NEI[51] that the indefinite storage scenario is not likely to occur. In fact, as NEI notes, the indefinite storage (or "no repository") scenario is remote and speculative, because it is contrary to existing federal law and assumes a complete and permanent government failure to fulfill the clear 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]

---

48 *Id.*

49 *Id.* at 56,784-785.

50 *Id.*

51 NEI Comments.

52 *Id.* Ultimate disposal of spent fuel is the Federal Government's statutory responsibility under the Nuclear Waste Policy Act, not the responsibility of individual NRC licensees of nuclear reactors. It is therefore reasonable under NEPA to assume that the Federal Government ultimately will accept responsibility for TVA's and other commercial SNF. Indeed, the D.C. Circuit recently granted a petition for a writ of mandamus, which required the NRC to comply with the Nuclear Waste Policy Act and continue with its review of the proposed high-level waste repository at Yucca Mountain. *See In Re Aiken County*, No. 11-1271 (D.C. Cir. Aug. 13, 2013). The Government's statutory responsibility was confirmed again by the D.C. Circuit in November 2013 when the Court concluded that DOE cannot collect fees from licensees for the disposal of spent fuel in part because DOE has not satisfied its statutory obligations. *Nat'l Ass'n of Regulatory Util. Comm'rs*, No. 11-1066 (D.C. Cir. Nov. 19, 2013). The Court, however, also acknowledged the significant funds that have already been collected and that the ruling does not relieve licensees from their obligation to ultimately pay for the cost of their waste disposal. Thus, the ruling does not affect the conclusion that the indefinite storage scenario is not likely to occur.

53 *See Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 354-56 & n.17 (1989) (citing NEPA Regulations, Proposed Rules, 50 Fed. Reg. at 32,236 ("the [previous rule requiring a "worst case analysis"] has proved counterproductive, because it has led to agencies being required to devote substantial time and resources to preparation of analyses which are not considered useful to decisionmakers and divert the EIS process from its intended purpose")); *Private Fuel*

Nonetheless, the D.C. Circuit specifically directed the agency to assess the environmental impacts of failing to establish a permanent repository, and TVA agrees with NEI that the NRC's consideration of an indefinite storage timeframe completely addresses the remand on this issue. Furthermore, inclusion of the indefinite storage scenario in the analysis helps the DGEIS to fully cover any possible environmental impacts associated with continued storage of spent fuel.

Accordingly, the timeframes considered by the NRC are reasonable given the direction of the D.C. Circuit, particularly within the context of an analysis performed under NEPA, which is governed by a "rule of reason" and allows for the exercise of agency discretion (particularly where highly technical matters such as spent fuel storage are involved). Here, the NRC has considered a broad spectrum of potential scenarios and made informed scientific judgments based on substantial available data, experience, and analyses about the possible impacts stemming from each storage scenario. Indeed, some assumptions, such as the 100 year replacement assumptions and the need to construct a DTS at every site, are likely very conservative, and add further support for the robust nature of the NRC's response to the D.C. Circuit decision.[54]

As discussed further below, the NRC's analysis of possible impacts from each storage scenario is applicable to TVA's nuclear plants, including WBN and any incremental impacts associated with issuance of an operating license for WBN-2.

III. The NRC's Generic Analysis of Spent Fuel Storage Impacts Is Fully Applicable to TVA's Nuclear Plants, Including WBN

This section confirms that the NRC's generic analysis of spent fuel storage impacts in the Proposed Rule and DGEIS is fully applicable to TVA's nuclear plants, including WBN-2; any site-specific differences are not expected to have any new or significant environmental impacts. Therefore, the NRC has completed a reasonable and thorough generic evaluation that fully satisfies NEPA and no site-specific evaluation of spent fuel storage impacts is necessary or warranted for any of TVA's plants, including WBN-2.

A. The Scope of the Proposed Rule and DGEIS Is Appropriate

TVA first notes that the scope of the Proposed Rule and the DGEIS is appropriate. The scope includes the environmental impacts of continued storage of SNF from the end of a reactor's licensed life for operation until disposal of the SNF.[55] This scope encompasses spent fuel storage issues applicable to TVA's nuclear plants.

Storage, L.L.C. (Indep. Spent Fuel Storage Installation), CLI-02-25, 56 NRC 340, 347 (2002) ("The purpose of an EIS is to inform the decisionmaking agency and the public of a broad range of environmental impacts that will result, with a fair degree of likelihood, from a proposed project, rather than to speculate about 'worst-case' scenarios and how to prevent them."); *id.* at 348-49 ("It is well established that NEPA requires only a discussion of 'reasonably foreseeable' impacts. Grappling with this concept, various courts have described it as a 'rule of reason,' or 'rule of reasonableness,' which excludes 'remote and speculative' impacts or 'worst-case' scenarios.") (citations omitted).

54 *See* NEI Comments.

55 DGEIS at 1-4 to 1-5.

The DGEIS explains that certain issues are eliminated from review in the GEIS, including foreign spent fuel, need for nuclear power, and reprocessing of commercial spent fuel.[56] The DGEIS also explains that the waste confidence rulemaking does not include whether NRC licensing activities and operation of commercial reactors should continue and does not include whether the NRC should impose additional requirements on spent fuel storage.[57] Specifically, the DGEIS states:

> Imposing new regulatory requirements, such as requiring licensees to implement hardened at-reactor storage systems, reduce the density of spent fuel in pools, or expedite transfer of spent fuel from pools to ISFSIs, is outside the scope of this proposed action, which includes alternatives that improve the efficiency of the NRC's licensing process by generically addressing the environmental impacts of continued storage. 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. Therefore, the NRC cannot impose new requirements or regulations on the duration of spent fuel storage in pools through this proposed action.[58]

TVA agrees that these issues are outside the scope of the waste confidence rulemaking.[59] Additionally, the exclusion of any of these topics does not impact the applicability of the Proposed Rule and DGEIS to TVA's plants.

B. The WBN Wet and Future Dry Spent Fuel Storage Facilities Are Comparable to the General or "Reference" Facilities Described in the DGEIS (Chapter 2)

DGEIS Chapter 2 discusses "typical facility characteristics and activities" that the NRC used to assess environmental impacts that may occur from continued storage of SNF.[60] These characteristics and activities are generally comparable to those for the WBN site. Some example characteristics and activities are provided below.

---

56 *Id.* at 1-23 to 1-24.

57 *Id.* at xxvi, 1-9 to 1-10.

58 *Id.* at 1-9.

59 As noted in the DGEIS, the NRC is considering many of these issues separately from both a regulatory and an environmental perspective. For example, the NRC is separately considering expedited transfer of spent fuel from pools as part of the lessons learned from the Fukushima event. *Id.* at 1-9 to 1-10. In this regard, the NRC recently briefed the Advisory Committee on Reactor Safeguards about these lessons learned. *See* Japan Lessons Learned Tier 3 Issue: Expedited Transfer of Spent Fuel to Dry Cask Storage, ACRS Full Committee Briefing (Dec. 2013), *available at* ADAMS Accession No. ML13339A521. The NRC Staff's presentation concludes that SFPs provide adequate protection and defense-in-depth and the overall estimated frequency of damage to stored fuel is low. *Id.* at 21. Additionally, based on the low risks from SFP accidents and the fact that the costs of expedited transfer outweigh the benefits, the Staff concluded that additional studies are not needed and no further action is recommended for the resolution of this issue. *Id.* at 24.

60 *See* DGEIS at 2-1.

WBN Characteristics

WBN consists of two Westinghouse-designed commercial pressurized water reactors ("PWRs"). Westinghouse-designed PWRs are widely used in the U.S. and worldwide. WBN-1 began commercial operation in May 1996. TVA resumed construction of WBN-2 in late 2008, and expects to complete construction and receive an operating license no later than June 2015. Characteristics of WBN-1 and WBN-2, including facility description, reactor core size, fuel design, enrichment, and burnup, are generally comparable to the reactor description assumptions in Section 2.1 of the DGEIS. For example, as discussed below, some of TVA's reactors have or may participate in tritium production for the Department of Energy ("DOE"), but that activity does not significantly alter their characteristics that are relevant to waste confidence considerations and any minor differences do not impact the DGEIS conclusions.

Fuel

During the scoping process, certain public comments focused on potentially different environmental impacts associated with high-burnup, MOX, and tritium producing fuel at certain TVA plants, including WBN.[61] As described in the DGEIS and in numerous other TVA and government environmental analyses, there are no new and significant environmental impacts associated with such fuel.

- TVA does not currently use MOX fuel at any of its nuclear plants, but TVA has considered possible future use of MOX fuel. As noted in DGEIS Section 2.1.1.3, because MOX fuel is substantially similar to existing uranium oxide light water reactor fuel and has already been used in U.S. light water reactors, it is within the scope of the DGEIS, and thus bounded by the analysis and conclusions of the DGEIS.[62]

- WBN-1 currently produces tritium as part of a Federal Government program for DOE. TVA has no current plans to produce tritium at WBN-2,[63] but if this occurs in the future, the considerations and impacts would be similar to those for WBN-1.

TVA explained the history behind and fully considered the potential environmental impacts of tritium production in its 2007 Final Supplemental Environmental Impact Statement ("FSEIS") for the completion of WBN-2.[64] That document states:

> In the late 1990s, TVA participated as a cooperating agency with DOE on an environmental review evaluating the production of tritium at one or more commercial light water reactors (CLWR) to ensure safe and reliable tritium supply for U.S. defense needs. In March 1999, the Secretary of DOE designated the TVA WBN and Sequoyah Nuclear Plant (SQN)

---

61 *See, e.g.*, Scoping comments at 7,13; *Id.*, Att. 1, at 4, 7-9, 13-20, 24, 28, 30-31; *Id.*, Att. 2, at 17; Charlotte Meeting Transcript at 143-44.

62 DGEIS at 2-8.

63 NUREG-0498, Final Environmental Statement Related to the Operation of Watts Bar Nuclear Plant, Unit 2, Supp. 2, at 4-96 (May 2013) ("WBN-2 FES"), *available at* ADAMS Accession No. ML13144A092.

64 Final Supplemental Environmental Impact Statement, Completion and Operation of Watts Bar Nuclear Plant Unit 2, Rhea County, Tennessee (June 2007) ("TVA June 2007 FSEIS"), *available at* ADAMS Accession No. ML080510469.

> as the preferred alternative for tritium production in the *Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor* (DOE 1999), hereafter referred to as the CLWR FEIS. DOE issued a ROD [Record of Decision] in May 1999. TVA issued its own notice of adoption and ROD for the CLWR FEIS in May 2000, and tritium production began at WBN Unit 1 in 2003. (The proposed action here does not include producing tritium at WBN Unit 2.) The CLWR FEIS also includes pertinent information on spent nuclear fuel management, health and safety, decommissioning, and other topics.[65]

As also shown in the 2007 FSEIS, use of a reactor for tritium production can increase the number of fuel assemblies over the life of a reactor, resulting in additional dry storage casks.[66] The estimates provided in the 2007 FSEIS were worst case scenarios. In reality, the number of tritium-producing burnable absorber rods ("TPBARs") used at WBN to date has only required TVA to load an extra net 4 fuel assemblies. If the projected trend continues, this will result in only a handful of additional casks (1 additional cask every 5 cycles of tritium operation). In any case, the item of interest addressed by the Proposed Rule (which is long-term storage of fuel) is not significantly impacted by the number of casks on the ISFSI pad.

The additional tritium production also should not significantly impact other environmental considerations. For example, although current operations are beyond the scope of the DGEIS,[67] the WBN radiological environmental monitoring program ("REMP") monitors any potential incremental environmental impacts from the production of tritium. The results of the REMP indicate effluents and direct radiation from WBN-1 and area hospitals and industrial facilities that use radioactive materials do not contribute measurably to the cumulative dose.[68] Also, the NRC Office of Inspector General report on the tritium production program states that WBN-1 total effluent releases of tritium (including all other plant processes) are "well below the regulatory limit."[69] Additionally, when the NRC completed its Environmental Assessment for a Sequoyah license amendment that would allow use of TPBARs, the NRC concluded that there were no significant radiological or non-radiological environmental impacts associated with the proposed action.[70] Finally, because tritium production ceases when operation ceases, any impacts post-shutdown are bounded by operating impacts. All of this information supports the conclusion that tritium production does not significantly increase environmental impacts of continued spent fuel

---

65 *Id.* at 8.

66 *Id.* at 95-96.

67 In this regard, many of the potential environmental impacts from tritium production, such as worker exposure and generation of low level waste, occur during operations and are not within the scope of the Proposed Rule or DGEIS.

68 WBN-2 FES at 4-96.

69 OIG-11-A-19, Evaluation of NRC's Oversight of Tritium Production at Commercial Nuclear Power Plants, at 10 (Sept. 21, 2011), *available at* ADAMS Accession No. ML112640193.

70 Letter from R. Hernan, NRC, to J. Scalice, TVA, Sequoyah Nuclear Plant, Units 1 and 2 – Environmental Assessment and Finding of No Significant Environmental Impact for Incore Irradiation of Tritium-Producing Burnable Absorber Rods (TAC Nos. MB2972 and MB2973) (Sept. 17, 2002), *available at* ADAMS Accession No. ML022600693.

storage. These impacts have been extensively considered through substantial independent environmental analyses of this issue that support the above conclusions. For example, as noted above, DOE, TVA, and the NRC have participated in environmental reviews of tritium production.

TVA believes that the DGEIS already encompasses nuclear plants used for tritium production. For example, the DGEIS states that it encompasses "fuel types that have been used in the past and continue to be stored under an NRC license" and "fuel types that are presently used."[71] Nonetheless, for clarity, TVA requests that the NRC address the issue of tritium production in the Final GEIS by confirming it is bounded and reference the substantial body of additional environmental analyses supporting this conclusion.

WBN SFP

WBN Units 1 and 2 share a SFP.[72] As discussed below, the WBN SFP uses a robust design that is consistent with the SFP designs discussed in the DGEIS:

- The WBN SFP is a reinforced concrete structure with a stainless steel liner for leak tightness. The SFP and spent fuel storage racks maintain the spent fuel assemblies in a subcritical array during all credible storage conditions, and the water in the SFP serves the purposes of cooling for radioactive decay and shielding. The storage pool is part of the Seismic Category 1 Auxiliary Building. The depth of the pool is sufficient to allow 26 feet of water shielding (nominally) above the spent fuel. Behind the pool liner welds is a leak chase to detect and collect leakage through the welds, and there is a pool water level monitoring system with indications and alarms in the control room.[73] Similar leak detection is provided for the fuel transfer canal and the cask loading area. The SFP cooling system is designed as Seismic Category 1 and is single failure proof. These design attributes for the WBN SFP cooling system provide substantial additional conservatism to the SFP design for WBN. Further, SFP system piping is arranged so that failure of any pipeline cannot drain the SFP below the water level required for radiation shielding. Therefore, this SFP design is consistent with, and in fact appears to exceed, the SFP designs considered in the DGEIS.

- The WBN SFP liner, rack structure, and fuel storage tubes are of welded stainless steel construction and components in the SFP are constructed of alloys that have a low differential galvanic potential between them and have a high resistance to general corrosion, localized corrosion, and galvanic corrosion.

- Additionally, the WBN SFP storage racks are qualified as Seismic Category 1 structures and ensure safe storage of spent fuel under normal and postulated accident conditions.[74] The racks provide storage of 1386 fuel assemblies.[75]

---

71 DGEIS at 2-5. Additionally, the DGEIS specifically mentions WBN-1. *See, e.g.*, DGEIS at 7-5.

72 A general description of the WBN SFP is provided in Sections 9.1.2 and 9.1.3 of the WBN-2 Final Safety Analysis Report ("FSAR"). *See* Watts Bar Nuclear Plant (WBN) – Unit 2 – Final Safety Analysis Report (FSAR), Amendment 109 (Aug. 23, 2012) ("WBN-2 FSAR"), *available at* ADAMS Accession Package No. ML122440027.

73 WBN-2 FSAR §§ 9.1.2.2 and 9.1.3.3.5.

74 *Id.* § 9.1.2.3.

75 *Id.* § 9.1.2.2.

Assuming a maximum uranium loading for each fuel assembly, TVA estimates that the WBN's SFP storage capacity is less than the 700 MTU storage capacity discussed in the DGEIS for the "reference spent fuel pool."[76]

- The WBN SFP system design includes the capability for periodic visual inspection and preventive maintenance. Periodic testing of components will be performed in accordance with plant procedures. All connections to the SFP are designed to preclude possible siphon draining of the pool water.

- As part of licensing of WBN-2, the NRC reviewed the incremental impacts of storing Unit 2 spent fuel in the shared WBN pool, including potential impacts associated with storage of tritium producing fuel from WBN-1. The Staff confirmed that the SFP conforms to the relevant requirements of GDC 2, 4, 5, 61, and 63 for protection against criticality, additional heat load, natural phenomena, missiles, pipe break effects, radiation protection, and monitoring provisions. Therefore, the NRC determined that the design of the shared SFP, including the storage of SNF used to produce tritium, is acceptable.[77]

- The DGEIS notes that the terrorist attacks on September 11, 2001 resulted in changes to NRC requirements for physical security and the safe operation of SFPs.[78] TVA has implemented the additional security measures applicable to SFPs. These activities provide additional assurances of the safety of continued storage of spent fuel.

- The DGEIS also notes that the response to the March 2011 Fukushima event could impact the NRC requirements applicable to SFPs.[79] In response to the events at Fukushima, NRC issued orders in March 2012, one of which requires licensees and Construction Permit ("CP") holders, including TVA for WBN-2, to have a reliable means of remotely monitoring wide-range SFP levels to support effective prioritization of event mitigation and recovery actions in the event of a beyond-design-basis external event.[80] An additional order requires licensees and CP holders to have a three-phase approach for mitigating beyond-design-basis external events, including use of installed equipment and resources to maintain or restore core cooling, containment, and SFP cooling.[81] TVA is on track to implement these requirements at WBN-2 prior to operation. These activities also provide additional assurances of the safety of continued storage of spent fuel.

As noted above, WBN Units 1 and 2 share a SFP, as do Sequoyah Units 1 and 2. However, they are not listed in DGEIS Table 2-1 ("U.S. Pressurized Water Reactors with Shared

---

76 DGEIS at 2-11.

77 NUREG-0847, Supplement 22, Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2, at 9-1 to 9-2 (Feb. 2011), *available at* ADAMS Accession No. ML110390197.

78 DGEIS at 2-11.

79 *Id.* at 2-11 to 2-12.

80 *See* EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Effective Immediately) (Mar. 12, 2012).

81 *See* EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Mar. 12, 2012).

Spent Fuel Pools").[82] TVA recommends that DGEIS Table 2-1 be updated to include Sequoyah with 2091 locations and WBN with 1386 locations as sites with shared SFPs.

ISFSIs

DGEIS Section 2.1.2.2 describes examples of at-reactor ISFSIs. TVA's existing and planned at-reactor ISFSIs, including a planned ISFSI for WBN, are fully consistent with those described in the DGEIS. TVA also concurs with the NRC's assumption that "an ISFSI of sufficient size to hold all spent fuel generated during licensed life for operation [will be] constructed during the reactor's licensed life for operation."[83]

TVA is implementing a fleet-wide used fuel management strategy that seeks to optimize both wet and dry storage and, ultimately, to ensure that adequate dry cask storage capacity is available through the use of the same or similar, NRC-licensed dry cask technology located on ISFSIs constructed under NRC's General License provisions. TVA currently has dry cask storage at the Sequoyah and Browns Ferry plants.[84] The procedures and programs developed during the operating years for TVA's plants, including procedures governing the loading of spent fuel assemblies into canisters and transfer casks within the pool for transfer to the ISFSI, will remain in place for the continued use of the SFPs until all SNF is transferred to the ISFSIs.

The WBN site does not yet have an ISFSI, but TVA currently plans to implement an at-reactor ISFSI for the WBN site by 2016 in accordance with the TVA fleet wide strategy. The ISFSI (the combination of the ISFSI pad and the vendor-supplied NRC-licensed dry cask storage system) to be developed at WBN will be designed and sited in compliance with 10-CFR Part 72 and meet cask vendor specifications. There is more than sufficient available land at the existing WBN site to construct the ISFSI and, if necessary, construct a DTS. TVA also plans to implement an additional ISFSI pad at Browns Ferry by 2018.[85]

Design and construction of an ISFSI at a TVA reactor site will fully conform to applicable NRC regulatory design and licensing criteria. The WBN ISFSI pad will be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, lightning, hurricanes, floods, tsunami, and seiches, without impairing its capacity to perform safety functions.

There are a number of ISFSI dry storage cask system designs that have been licensed by the NRC and are in operation in the U.S., including facilities at the Sequoyah and Browns Ferry plants. TVA's selection of a dry cask storage system and design and construction of an ISFSI at WBN will comply with NRC regulations for dry cask storage and be in accordance with 10 CFR Part 71 requirements regarding the packaging and transport of SNF to ensure that the WBN SNF is amenable to transport to a DOE or its successor agent facility when available.

---

82 DGEIS at 2-5.

83 *Id.* at 2-17.

84 *See* Z. I. Martin, Sr. Program Manager, Nuclear Spent Fuel Nuclear Reactor Engineering and Fuels, TVA, "Used Fuel Management Fleet Perspective—Tennessee Valley Authority," 2013 INMM Meeting, Washington, D.C., at 12 (Jan. 14-16, 2013), *available at* http://www.inmm.org/AM/Template.cfm?Section=Spent_Fuel_Seminar_2012&Template=/CM/ContentDisplay.cfm&ContentID=3523 (last visited Dec. 14, 2013).

85 *Id.* at 17.

As discussed in more detail in Section IV.B below, the WBN ISFSI will be under institutional control for the duration of SNF storage at WBN. Additionally, as demonstrated by its experience with its Browns Ferry and Sequoyah nuclear plants, TVA will demonstrate that the future WBN ISFSI will comply with relevant requirements.

Generic Activities for SFPs and ISFSIs

DGEIS Section 2.2 discusses generic activities for SFPs and ISFSIs for each of the timeframes considered in the DGEIS. Specifically, for the short-term storage timeframe, the DGEIS considers decommissioning activities of plant SSCs not required for continued storage of spent fuel, routine maintenance of the SFP and ISFSI, and transfer of spent fuel from the SFP to the at-reactor or away-from-reactor ISFSI.[86] During the long-term storage timeframe, the DGEIS considers continued facility maintenance, construction and operation of a DTS, and storage facility replacement.[87] During the indefinite storage timeframe, the DGEIS states that activities described for the long-term storage timeframe are assumed to continue indefinitely, including replacement of storage facilities once every 100 years.[88]

TVA has not identified any activities that it plans to conduct that would be inconsistent with those discussed in DGEIS Section 2.2. For example, the DGEIS assumes timely decommissioning of reactors in accordance with 10 CFR 50.82 and 52.110(c), and that all spent fuel would be moved from SFPs to dry storage by the end of the short-term timeframe (*i.e.*, within 60 years beyond the licensed life for reactor operations).[89] Such assumptions are reasonable and applicable to TVA's nuclear plants, including WBN.

Finally, TVA also agrees with NEI's comments that the NRC should add further discussion to the GEIS of the lessons learned from the Fukushima event regarding the robustness of SFP and ISFSI storage, and that this operating experience is significant evidence of the substantial safety assurance provided by SFPs and dry cask storage.[90]

C. The DGEIS (Chapter 3) Provides a Reasonable Description of the "Affected Environment" and Is Comparable to TVA's Nuclear Plants and Their Environs

DGEIS Chapter 3 discusses the "affected environment" around facilities with SFPs/spent fuel storage. Notably, Chapter 3 states that the Staff has relied on the comprehensive description of the affected environment during operation that is contained in the license renewal GEIS (NUREG-1437).[91] The license renewal GEIS, which is a final document that was subject to public comment, is intended to encompass all plants, including TVA's plants. Chapter 3 includes a discussion of: land use; socioeconomics; environmental justice; climate and air quality; geology and soils; surface water quality and use; groundwater quality and use; terrestrial resources; aquatic ecology; special status species and habitats; historic and cultural resources; noise; aesthetics; waste management; transportation; and public and occupational health.

---

86 DGEIS at 2-22 to 2-27.
87 *Id.* at 2-27 to 2-29.
88 *Id.* at 2-29.
89 *Id.* at 2-26.
90 NEI Comments.
91 DGEIS at 3-1.

TVA concludes that DGEIS Chapter 3 provides a reasonable description of the affected environment for consideration of the issues in the DGEIS, and that this description is comparable to TVA's plants for the purposes of the DGEIS. Additionally, TVA's nuclear plants have been subject to numerous environmental analyses conducted by TVA itself, and by other regulatory agencies, such as the NRC. These analyses have resulted in an extensive public environmental record for TVA's nuclear plant sites. For example, the NRC recently issued the FES for the WBN-2 operating license, which includes hundreds of pages of environmental analysis.

D. The Staff's Evaluation in the DGEIS (Chapter 4) of the Environmental Impacts of At-Reactor Continued Storage of Spent Fuel Is Reasonable and Applicable to TVA

DGEIS Chapter 4 evaluates in detail the environmental impacts of continued at-reactor storage of spent fuel in a SFP or ISFSI, including during the short-term, long-term, and indefinite timeframes described above. The resources areas reviewed in Chapter 4 include: land use; socioeconomics; environmental justice; air quality; climate change; geology and soils; surface-water quality and use; groundwater quality and use; terrestrial resources; aquatic ecology; special status species and habitat; historic and cultural resources; noise; aesthetics; waste management; transportation; public and occupational health; environmental impacts of postulated accidents; and potential acts of sabotage or terrorism.

DGEIS Table 4-2 provides a summary of the environmental impacts of continued at-reactor storage for these resource areas.[92] As shown in that table, the NRC concluded that the impacts for all of the resources would be SMALL for all three timeframes with a few exceptions.

- The first exception is that the environmental impacts for historic and cultural resources would be SMALL, MODERATE, or LARGE for long-term and indefinite storage timeframes. The magnitude of adverse effect on historic properties and impact on historic and cultural resources largely depends on what resources are present, the extent of proposed land disturbance, whether the area has been previously surveyed to identify historic and cultural resources, and whether the licensee has management plans and procedures that are protective of historic and cultural resources.[93]

- The second exception is that the environmental impacts for waste management of nonradioactive waste would be SMALL to MODERATE for indefinite storage, because it is difficult to accurately estimate the amount that would be generated over an indefinite timeframe.[94]

These general conclusions regarding environmental impacts apply to TVA's plants, although TVA believes that the impacts would be SMALL. A few of the specific conclusions are discussed below.

- DGEIS Section 4.1 concludes that land use impacts would be SMALL because storage would only affect a small fraction of the land committed for a nuclear power plant.[95] TVA agrees with this conclusion. TVA anticipates that the extended storage facilities for

---

92 *Id.* at 4-90 to 4-91.
93 *Id.* at 4-50.
94 *Id.* at 4-61.
95 *Id.* at 4-4 to 4-6.

WBN-2 would be within the area of potential effect associated with WBN-2 and restricted to existing disturbed portions of the plant property.

- As noted in DGEIS Sections 4.6, 4.7, and 4.8, SFP leaks could result in radiological contamination of soils, groundwater, and surface water.[96] TVA agrees that the environmental impacts of continued spent fuel storage at its nuclear plants, including WBN-2, on these environmental areas would be SMALL. These conclusions are described further in Section III.G below.

- As discussed above, DGEIS Section 4.12 assumes that the environmental impacts for historic and cultural resources could be SMALL, MODERATE, or LARGE for long-term and indefinite storage timeframes. TVA agrees with NEI's comment that this impact should be SMALL for all continued storage scenarios.[97] Some of the reasons for a SMALL impact for TVA include: TVA already has a large area of previously disturbed land at its sites that would be used for the construction of storage facilities, TVA would mitigate any adverse effects on historic properties, TVA has appropriate management plans and procedures that are protective of historic and cultural resources, and these activities would be subject to further consideration of historic and cultural impacts during future regulatory activities.

    - The SMALL impact is further supported by the extensive environmental analyses performed for TVA's plants. For example, the recent WBN-2 FES includes background information on the historic and cultural resources and then concludes that the impacts are SMALL.[98] TVA identified one archaeological site in the area of potential effect at the WBN site, which TVA has designated as an archaeological avoidance area.[99] Any extended storage facilities would not be located within the archaeological area, and therefore no impacts would occur to known cultural resources.

- DGEIS Section 4.17 concludes that radiological impacts from public and occupational doses would be SMALL because the doses would continue to remain below the regulatory dose limits.[100] TVA agrees. After all the SNF is in dry cask storage and decommissioning is complete, the ISFSI facility would be the source of public dose from the exposure pathway of direct radiation. A program of monitoring the ISFSI would remain in place to ensure the health and safety of the public, the workers, and the security of the spent fuel. TVA would minimize doses by the use of shielding, distance, and reduced stay time around the material. The expected dose from the ISFSI alone would be a decrease from the dose during the decommissioning phase. The public dose estimates for SNF management in dry cask storage would be expected to be well below the required limits for dose to members of the public. The potential impacts from dose

---

96 *See id.* at 4-20 to 4-28.

97 NEI Comments.

98 *See* WBN-2 FES at 2-79 to 2-82, 4-49 to 4-51. The NRC stated that its SMALL impact conclusion is based on: "(1) historic and cultural resources located within the [area of potential effect], (2) Tennessee Historical Commission's concurrence with the TVA and the NRC staff determinations that no National Register of Historic Places listed or eligible properties would be affected by this undertaking, (3) the TVA existing best measures related to managing cultural resources, and (4) the NRC staff's cultural resource analysis and consultation." *Id.* at 4-50 to 4-51.

99 WBN-2 FES at 2-80.

100 DGEIS at 4-64 to 4-67.

exposure offsite would be insignificant and decreasing with each year of radioactive decay.

- As described in DGEIS Sections 4.18.1 and 4.18.2, the environmental risks of continued storage of spent fuel associated with postulated accident conditions, such as design basis events for SFPs and dry cask storage systems, including hazards from natural phenomenon, such as earthquakes, floods, and tornadoes, and severe accidents, are SMALL.[101] These conclusions apply to TVA's plants, including WBN-2. For example, as discussed above in Section III.B, the WBN-2 SFP design includes seismically qualified pool structures, racks, and cooling systems that would help protect it during postulated design basis events. These protections have been further enhanced following the September 11 terrorist attacks and the Fukushima event.

  - Furthermore, as discussed above in Section III.B, TVA's existing and planned at-reactor ISFSIs, including a planned ISFSI for WBN, are fully consistent with those described in the DGEIS. These ISFSIs[102] are designed to rigorous seismic and flooding criteria, as required by the NRC regulations. Moreover, the significant robust protection from external events has been demonstrated by real world events, including the August 23, 2011 Mineral, Virginia earthquake near the North Anna nuclear power plant and the March 11, 2011 earthquake and subsequent tsunami that damaged the Fukushima Dai-ichi nuclear power plant. Neither event resulted in significant damage to or the release of radionuclides from the dry cask storage containers.

  - A recent paper prepared by one of the NRC Staff's lead structural engineers and reviewers (acting in individual capacity as an engineer) further supports the robust nature of ISFSIs.[103] That paper concludes, with "a high degree of confidence," that spent fuel assemblies stored in ISFSI locations within the most seismically-active regions in the Central and Eastern U.S. will not pose undue radiological hazard, in large part because greater seismic inertia loads are bounded by other design loads.[104] According to the paper, "[t]he built in defense-in-depth for the analysis/design of these casks, and rigorous construction and periodic maintenance of these facilities required by the applicable regulations provide reasonable assurance that these facilities are safe."[105]

  - Additionally, as discussed above, TVA is taking actions to implement the requirements of the NRC's orders and other requirements following the March 2011 Fukushima event, including requirements for seismic and flooding reevaluations. These reevaluations are discussed in the DGEIS.[106] TVA's actions and plans are

---

101 *Id.* at 4-69 to 4-83.

102 As an example of the robust evaluations for ISFSIs, the Sequoyah ISFSI was evaluated and designed to ensure that the design basis flood depth and velocity for the cask system bounds the probable maximum flood depth and velocity for the Sequoyah ISFSI.

103 *See* Tripathi, B. P., "Overview of Independent Spent Fuel Storage Installation (ISFSIs) in the New Madrid Seismic Zone (NMSZ) and Wabash Valley Seismic Zone (WVSZ)," *Transactions*, SMiRT-22, San Francisco, CA (Aug. 2013), *available at* ADAMS Accession No. ML13120A648.

104 *Id.* at 9.

105 *Id.*

106 DGEIS at 4-72 to 4-73.

consistent with the statements in the DGEIS and further demonstrate that the TVA ISFSIs will comply with applicable regulatory requirements to ensure safe and environmentally sound spent fuel storage.

- Flooding prediction modeling and calculations for WBN indicate that the plant grade elevation at WBN can be exceeded by large rainfall and seismically-induced dam failure floods, so structures, equipment, and operating procedures are designed to assure safety, including that extreme flood conditions will not adversely affect safe storage of spent fuel.[107] Flood models and calculations are updated periodically and as needed to take into account updated historical meteorological records, changes in hydrological features in the area, and other pertinent considerations. Changes are then incorporated into the FSAR through amendments.[108]

- DGEIS Section 4.19 discusses potential acts of sabotage or terrorism on SFPs and ISFSIs. The probability and consequences of attacks on SFPs is considered only during the short-term timeframe, because the spent fuel would be transferred to ISFSIs by that time.[109] The probability and consequences of attacks on ISFSIs are considered for all timeframes.[110] Based on the very low probability of a successful attack, the DGEIS concludes that the environmental risk is SMALL, and the "continued storage of spent fuel will not constitute an unreasonable risk to the public health and safety from acts of radiological sabotage theft or diversion of special nuclear material."[111] Nonetheless, as discussed in the DGEIS, there is a dispute among the U.S. Courts of Appeals as to whether NEPA analyses require consideration of terrorist attacks, with the Court of Appeals for the Ninth Circuit holding that the NRC must consider terrorism in its NEPA reviews.[112] Because TVA's nuclear plants are not located in the Ninth Circuit, this consideration of the environmental impacts is unnecessary. This position is consistent with the Court of Appeals for the Third Circuit's holding in *New Jersey Department of Environmental Protection v. NRC*, 561 F.3d 132 (3d Cir. 2009), where the Court held that the NRC was not required to prepare an EIS concerning the effects of terrorist attacks as part of a license renewal application. Nevertheless, the conclusions about small impacts from sabotage or terrorism apply to TVA's plants, particularly because TVA has implemented the required measures following the September 11 terrorist attacks.

  - With respect to security, the WBN ISFSI will be in compliance with NRC regulations requiring physical protection of stored SNF (10 CFR 73.51). Furthermore, the WBN

---

107 *See* WBN-2 FSAR § 2.4.14.

108 TVA notes that it recently received findings and notices of violations related to flooding issues. *See* EA-13-018, Watts Bar Unit 1 Nuclear Plant – Final Significance Determination of Yellow Finding, White Finding and Notices of Violations; Assessment Follow-up Letter; Inspection Report No. 05000390/2013009 (June 4, 2013). TVA has taken corrective actions and will continue to take actions to address these findings and notices of violations. *See, e.g.*, Letter from J. Shea, TVA, to NRC, Reply to a Notice of Violation; EA-13-018 (July 3, 2013), *available at* ADAMS Accession No. ML13192A033. Thus, any issues associated with these findings and notices will be addressed in the near-term and will have no effect on the continued safe storage of spent fuel that is considered in the Proposed Rule and DGEIS.

109 DGEIS at 4-84 to 4-85.

110 *Id.* at 4-85.

111 *Id.* at 4-89 to 4-90.

112 *Id.* at 4-84.

ISFSI design and location will be in compliance with security-based limits and vehicle physical barrier requirements to protect against terrorist attack or sabotage, and other security-related events.

- The NRC has developed a set of rules specifically aimed at protecting the public from harm that could result from sabotage of SNF casks. There are numerous physical protection and safeguards regulations (*i.e.*, 10 CFR 73.37; 10 CFR 73.51) that must be implemented. The dry storage cask safety features that provide containment, shielding and thermal protection also provide protection against sabotage.

In summary, as described above, TVA is not aware of any aspects of its plants that would place them outside the generic evaluation of the environmental impacts of continued at-reactor storage of spent fuel that is provided in the DGEIS. In this regard, TVA concludes that the potential impacts from extended storage at the WBN site are not expected to increase or substantially change from those identified in previous environmental documents, and no additional mitigation measures beyond those already being implemented, committed to, or added in the future would be required. Additionally, TVA is not aware of any comments submitted to date, either during scoping or during public meetings, that would change this conclusion.

E. The NRC's Discussion of the Technical Feasibility of Continued Safe Storage of Spent Fuel Is Fully Applicable to TVA (DGEIS Appendix B)

DGEIS Appendix B addresses the technical feasibility of continued safe storage of spent fuel, including the technical feasibility of wet storage (Section B.3.1) and the technical feasibility of dry cask storage (Section B.3.2).

As described further below, TVA has not identified anything in these sections of the DGEIS that is inconsistent with its own substantial spent fuel storage experiences and plans. For example:

- There is nothing unique about the fuel to be used at WBN-2 and the design of the WBN SFP complies with applicable regulatory requirements. Therefore, NRC's analysis and assumptions in DGEIS Section B.3.1.1 regarding the integrity of spent fuel and cladding in SFPs applies to WBN-2 and TVA's other nuclear sites.[113]

- Also as discussed above, the WBN SFP is a reinforced concrete structure with a stainless steel liner for leak tightness. The storage pool is part of the Seismic Category 1 Auxiliary Building that protects against a wide-range of natural and human-induced challenges, including the maximum potential earthquake stresses for the region where the plant is sited.

- The SFP cooling system is designed as Seismic Category 1 and is single failure proof and SFP system piping is arranged so that failure of any pipeline cannot drain the SFP below the water level require for radiation shielding. Therefore, NRC's analysis and assumptions in Section B.3.1.2 regarding the robust structural design of SFPs applies to WBN-2 and TVA's other nuclear sites.

---

113 *Id.* at B-8 to B-9.

Similarly, TVA's own experience with dry cask storage fully supports the NRC's conclusions that dry cask storage is technically feasible for the timeframes considered in the DGEIS.[114] In fact, TVA believes that the NRC's assumption of replacing dry casks every 100 years of service life is very conservative, and that due to their robust design the casks could last much longer without substantial maintenance.

F. The NRC's Discussion of Its Continuing Regulatory Oversight of Wet and Dry Spent Fuel Storage Is Fully Applicable to TVA

DGEIS Appendix B discusses a number of ongoing regulatory programs related to the continued safety and security of spent fuel storage. Specifically, DGEIS Section B.3.3 discusses how the NRC's regulatory program has addressed potential safety and security concerns and routine operations, and concludes that "the vitality and evolution of the NRC's regulatory requirements support a reasonable conclusion that continued storage, even over extended periods of time beyond those regarded as most likely, will continue to be safe with the same or fewer environmental impacts."[115] TVA is subject to this continuing oversight, which provides further assurance of continued safe and secure spent fuel storage.

Some examples of specific regulatory actions and oversight discussed in Section B.3.3 and how they apply to TVA are provided below:

- Section B.3.3.1 describes extensive regulatory actions related to routine operations, accidents, and terrorist activity. For example, the NRC describes extensive actions it has taken to improve spent fuel safety and security following the terrorist attacks of September 11, 2001, including orders requiring additional security measures, including increased patrols, augmented security forces and capabilities, and more restrictive site-access controls.[116] TVA has fully complied with those NRC orders. Another example is the NRC's March 2012 orders and other requirements related to the Fukushima event.[117] TVA has undertaken significant efforts to comply with those orders and other requirements, including activities related to SFP instrumentation and mitigative strategies, as well as ongoing seismic and flood reevaluations.

- Section B.3.3.2 discusses regulatory oversight of SFP leaks. That section identifies specific changes to NRC requirements and guidance with respect to SFP leaks. TVA has complied with and will continue to comply with applicable NRC requirements with respect to SFP leaks. For example, as discussed in the next section, TVA was subject to regulatory oversight for the SFP leak identified at WBN-1.

- Section B.3.3.3 discusses the regulatory framework for dry cask storage. That section discusses the evolution of the framework based on the need for dry cask storage. TVA has complied and will continue to comply with applicable NRC requirements with respect to dry cask storage.

These regulatory requirements and the NRC's continued oversight and evolution of the requirements in response to new information or developments provide additional assurance that spent fuel will be stored and managed in a safe and secure manner. This provides further demonstration of TVA's ability to safety store spent fuel.

---

114 *Id.* at B-11 to B-15.
115 *Id.* at B-15 to B-16.
116 *Id.* at B-16.
117 *Id.* at B-16 to B-17.

G. The NRC's Analysis of SFP Leaks Is Fully Applicable to TVA

DGEIS Appendix E describes the environmental impacts of SFP leaks that may occur during the short-term storage timeframe, and concludes that the environmental impacts from leaks would be SMALL to groundwater, surface water, soils, and public health.[118]

TVA has confirmed that these conclusions regarding the impacts of SFP leaks apply to its nuclear plants, including WBN. For example, as discussed above, the WBN SFP has a robust design, stainless steel liner, and leak detection. The SFP, the SFP cooling and cleaning system, and its equipment are designed to prevent leaks, collect and contain leakage in the event of a leak and route it to the radwaste system, detect leaks, detect water level changes and alarm at low and high set points, and monitor radiation levels in the SFP area. In addition, the SFP is operated to prevent leaks through inspections of seals, routine surveillance of the area, inspection of equipment and instrumentation, and periodic inspection of the SFP drainage channels. These design features and operating standards work to ensure against leakage from SFP releases to the environment.

TVA would also continue monitoring for radioactive contamination through its REMP during the time that the SFP remains in service until it is decommissioned to ensure that environmental impacts are monitored and appropriate mitigation measures can be enacted if a need is indicated. As discussed below, the WBN system of monitoring wells was expanded when tritium was detected in one of WBN's on-site environmental monitoring locations in August 2002. TVA installed additional monitoring wells as a modification to its REMP and initiated an investigation to determine the cause and pathways of contamination. As discussed in the WBN-2 FES, TVA has implemented an extensive Ground Water Protection Program to monitor the onsite plant environment for indication of leaks from plant systems and buried piping carrying radioactive liquids, including a groundwater monitoring program to detect and track tritium in groundwater.[119] TVA would respond to and address any spills through its ongoing REMP.[120] TVA currently has six REMP monitoring wells at the WBN site and has added 19 non-REMP monitoring wells to track the onsite groundwater plume to identify the presence or increase of radioactivity in groundwater.[121]

DGEIS Table E-4 ("Occurrence of Spent Fuel Pool Leakage at U.S. Nuclear Power Plants") discusses an August 2002 leak of "[t]ritium and mixed fission products" at WBN-1 as an "inadvertent liquid radioactive release[] to the environment."[122] Table E-5 ("Dose from Inadvertent Releases of Radioactive Liquids from Nuclear Power Plant Spent Fuel Pools") indicates that the maximum detected tritium concentration within the site boundary is 30,000 pCi/L, and that the "[g]roundwater plume has not migrated offsite."[123]

As further explained in the recent WBN-2 FES, TVA detected the tritium in August 2002 in one of the onsite environmental monitoring locations just at the detectable level. In response to this detection, TVA modified the REMP and installed additional monitoring wells. Following additional indications of tritium, TVA made numerous modifications to WBN-1 to stop tritium leakage, including sealing the fuel transfer tube for WBN-2 and coating the fuel transfer canal. Current tritium concentrations are below the NRC reporting

---

118 *Id.* at E-19.
119 WBN-2 FES at 4-12.
120 *Id.*
121 *Id.* at 2-12.
122 DGEIS at E-20.
123 *Id.* at E-21.

level, and no other groundwater quality impacts have been identified.[124] Additionally, offsite groundwater wells have not been affected by site operations.[125] In summary, TVA has repaired the SFP, halted the leaks, and implemented extensive groundwater monitoring, and this monitoring has not identified any additional groundwater impacts from the identified leaks. In the unlikely event of additional SFP leaks, TVA will take similar comprehensive action to investigate and eliminate such leaks.

This experience fully supports and confirms that: "based on the low probability of a leak with sufficient quantity and duration to reach offsite locations, the detection and monitoring mechanisms available to licensees and the NRC, and the hydrologic characteristics at typical spent fuel pool sites, the NRC concludes that the radiological impacts to groundwater quality resulting from a spent fuel pool leak during short-term timeframe would be SMALL."[126]

As noted above, DGEIS Table E-5 states that the maximum tritium contamination detected within the site boundary for the WBN SFP leak was 30,000 pCi/L.[127] This value appears to be inconsistent with the WBN-2 FES, which states: "The highest concentration of tritium detected in 2005 was approximately 20,400 Bq/L (550,000 pCi/L)."[128] TVA requests that the NRC review its source of the WBN information in DGEIS Table E-5 and correct it if necessary to be consistent with the WBN-2 FES. Changing this value has no impact on the SMALL impact conclusion, particularly because there are no further indications of leakage from the WBN SFP and the value is bounded by other values in DGEIS Table E-5.[129]

H. The NRC Staff's Analysis of SFP Fires Is Fully Applicable to TVA's Storage of Spent Fuel

DGEIS Appendix F examines the environmental impacts of postulated SFP fires during the short-term storage timeframe, and concludes that the environmental impacts from SFP fires are small. The DGEIS only looks at the short-term timeframe because it assumes that all spent fuel will be moved out of the pools by the end of that timeframe.[130] Appendix F concludes that "the probability-weighted impacts, or risk, from a spent fuel pool fire for the short-term storage timeframe are SMALL because, while the consequences from a spent fuel pool fire could be significant and destabilizing, the probability of such an event is extremely remote."[131]

The DGEIS Appendix F analysis applies to TVA's nuclear plants, including WBN. For example, the DGEIS Appendix F analysis relies on a number of existing NRC reports,

---

124 In 2010, after repairs and modifications at WBN, the maximum tritium concentration observed in groundwater samples was 106 Bq/L (2,860 pCi/L), which is well below the NRC reporting level of 1,110 Bq/L (30,000 pCi/L). Annual Radiological Environmental Operating Report, Watts Bar Nuclear Plant 2010, at 21 (Apr. 2011), *available at* ADAMS Accession No. ML11137A122.

125 WBN-2 FES at 2-12 to 2-13.

126 DGEIS at E-16 to E-17.

127 *Id.* at E-21.

128 WBN-2 FES at 2-13. *See also* TVA June 2007 FSEIS at 53 ("The highest amount of tritium detected was approximately 550,000 pCi/L.").

129 DGEIS at E-21.

130 *Id.* at F-1 n.1.

131 *Id.* at F-1.

including WASH-1400, NUREG-1353, and NUREG-1738.[132] Additionally, the NRC's analysis of SFP fires includes significant conservatisms, many of which are specifically identified in the DGEIS. Some of these conservatisms include:

- **Recent Mitigation Improvements:** In general, since the NRC completed the NUREG-1738 study in 2001, it has issued numerous regulations and orders that further reduce the likelihood of an unlikely SFP fire. These additional reductions in the likelihood of a SFP fire mean that the risks are lower now than those NRC reported in its 2001 study. Further, no new information has emerged that would cause the NRC to question the results of this study.[133] Some examples include:

    - **Security Improvements:** After the September 2001 terrorist attacks, the NRC issued orders to licensees to implement additional security measures, including increased patrols, augmented security forces and capabilities, and more restrictive site-access controls to reduce the likelihood of an accident, including those that might induce a SFP fire accident, resulting from a terrorist-initiated event.[134]

    - **Mitigation Measures:** Also after the September 2001 terrorist attacks, the NRC issued orders to licensees that required site-specific assessment of SFP vulnerabilities and required the implementation of additional mitigation strategies that can be effective in maintaining SFP cooling in the event of pool draining and pool water is reduced or lost entirely. NEI has published these generic strategies for SFP cooling in NEI-06-12, Rev. 2, and this has been endorsed by the NRC. The NRC has since codified these requirements in 10 CFR 50.54(hh)(2) to require licensees to implement mitigating measures to maintain or restore SFP cooling capability in the event of loss of large areas of the plant due to fires or explosions, which further decreases the probability of a SFP fire.[135]

    - **Post-Fukushima Measures:** In Order EA–12–049, the NRC required licensees to implement mitigating strategies to ensure that SFP cooling can be accomplished through alternative means to prevent fuel damage. In addition, in Order EA–12–051, the NRC determined that commercial power reactor licensees must have a reliable means to remotely monitor a wide range of SFP levels to support effective prioritization of event mitigation and recovery actions in the event of a beyond-design-basis external event.[136]

- **Fuel Uncovery Time:** NUREG-1738 assumed that the zirconium fuel cladding would start to burn and was nonrecoverable as soon as the water level in the SFP fell to within 0.9 m (3 ft) of the top of the fuel assemblies. However, a 2008 analysis showed that there would be significant time between the initiating event and the spent fuel assemblies becoming partially or completely uncovered.[137] Thus, more time would be

---

132 *Id.* at F-15.

133 *Id.* at F-3, F-12.

134 *Id.* at F-11.

135 *Id.*

136 *Id.* at F-12.

137 *See generally* The Attorney General of Commonwealth of Massachusetts, The Attorney General of California; Denial of Petitions for Rulemaking, 73 Fed. Reg. 46,204 (Aug. 8, 2008).

available for operator intervention, which would lower the probability of a drain-down event leading to a SFP fire.[138]

- **Decay Time and Discharge Time from Reactor:** As the fuel continues to age after reactor shutdown, it will become less hazardous due to radioactive decay and the reduction of the heat generated by the spent fuel.[139] NUREG–1738 concluded that it would take more than 4 days for a PWR SFP and more than 6 days for a boiling water reactor (assuming a 60 day decay time for the fuel) for the water to reach within 0.9 m (3 ft.) of the top of the fuel assemblies due to heating, boiling, and evaporation of the SFP water. However, if a 2 year decay time for the spent fuel were assumed, then the time for the water to reach within 0.9 m (3 ft.) of the top of the fuel assemblies would be more than 11 days for a PWR and more than 14 days for a boiling water reactor. This provides additional time to take mitigating action to prevent a SFP fire.[140]

- **Decay Time and Likelihood of a SFP Fire over the Duration of the 60-year Short-Term Period:** The likelihood, extent, and therefore the release magnitude associated with a SFP fire decreases dramatically over the initial years of the 60-year short term period. NUREG-1738 notes that fire propagation is expected to be limited to less than two full cores (from 3.5 cores) within 1 year following plant shutdown. This reduction in the amount of fuel participating in the zirconium fire is due to the lower heat generation rate associated with the fuel assemblies as radioactive decay continues throughout the 60-year period. Spent fuel is generally able to be removed from SFPs for dry storage following a 5 year wet storage period, demonstrating the reduced cooling requirements as a function of time. The risk of a SFP fire by year 10 of the 60-year period would be expected to be very small, and any associated consequences considerably smaller than that represented by NUREG-1738.

    - The NRC has also concluded that air-cooling of spent fuel would be sufficient to prevent SFP zirconium fires at a point much earlier following fuel offload from the reactor than was considered in NUREG-1738.[141]

- **Fukushima Evidence:** Finally, as the DGEIS notes, the Fukushima event led to a substantial release of radioactive material, but the fuel stored in the SFPs was not uncovered and the event did not lead to a SFP fire. Information on the event indicates that SFP cooling was lost for all SFPs following the loss of offsite power. However, subsequent analyses and inspections confirmed that the SFP water levels did not drop below the top of the fuel in any of the SFPs and no significant damage occurred to the fuel in the pools. These events demonstrate that, even without spent fuel cooling for multiple days, the pools were able to maintain cooling.[142]

TVA agrees with the conclusions in the DGEIS and is in compliance or currently addressing the NRC's various orders and requests, including those related to the Fukushima event. For these reasons, the conclusions in Appendix F regarding SFP fires are fully applicable to TVA's plants and demonstrate that environmental impacts of SFP fires during the short-term storage timeframe are small.

---

138 DGEIS at F-10 to F-11.

139 *Id.* at F-8 to F-9.

140 *Id.* at F-11.

141 *See* Denial of Petitions for Rulemaking, 73 Fed. Reg. at 46,208; DGEIS at F-11.

142 DGEIS at F-12.

TVA also agrees with NEI's comment[143] that the NRC should update DGEIS Appendix F to reference the NRC's recent SFP "Consequence Study."[144] Based on this study and previous studies, the NRC continues to believe "that spent fuel pools protect public health and safety."[145]

Although the DGEIS already discusses the conservative nature of the SFP fires analysis, TVA requests that the NRC further highlight the significant conservatisms in that analysis that are discussed above to further support the small impacts from SFP fires.

IV. Additional TVA Comments

A. The DGEIS Assumption that WBN-1 Will Seek License Renewal Is Appropriate

The DGEIS states that WBN-1 is not yet eligible to request renewal, but that "[t]he NRC assumes that this facility will undergo a license renewal review for purposes of this analysis."[146] This assumption is reasonable; TVA is not aware of any reason that it will not seek license renewal of WBN-1. Additionally, this assumption is intended to lend conservatism to the Staff's environmental impacts analysis for continued spent fuel storage.

B. The DGEIS Assumptions Regarding Institutional Controls Are Appropriate

The NRC also has made reasonable assumptions regarding the continued availability of institutional controls over spent fuel storage. Specifically, the DGEIS states:

> Institutional controls, i.e., the continued regulation of spent nuclear fuel, will continue. This assumption avoids unreasonable speculation regarding what might happen in the future regarding Federal actions to provide for the safe storage of spent fuel. Although government agencies and regulatory safety approaches can be expected to change over long periods of time into the future, the history of radiation protection has generally been towards ensuring increased safety as knowledge of radiation and effectiveness of safety measures has improved. For the purpose of the analyses in this draft GEIS, the NRC assumes that regulatory control of radiation safety will remain at the same level of regulatory control as currently exists today.[147]

---

143 NEI Comments.

144 Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a US Mark I Boiling Water Reactor (June 2013), *available at* ADAMS Accession No. ML13256A342.

145 *Id.* at xii.

146 *See* DGEIS at 7-5 to 7-6 (notes 4 & 5).

147 *Id.* at 1-14 to 1-15 (citation omitted); *see also* Proposed Rule, 78 Fed. Reg. at 56,788.

It is entirely reasonable for the NRC, like other government agencies in other waste-related contexts, to assume that institutional controls will remain for all reactor sites. There is nothing unique about TVA's plants in this regard.

- TVA's ISFSIs will be under institutional controls of TVA for the duration of SNF storage. Institutional controls will be both active (monitoring, surveillance, remedial work) and passive (land use control), and involve making sure that corrective or enforcement measures are taken if the results of the checking or monitoring indicate an unsatisfactory situation. Future mandates for controls and extended storage would be expected to evolve over time, but as the license holder for ISFSIs, TVA would implement any necessary changes to maintain compliance with future regulation and maintain the health and safety of the public as long as necessary.

- The continued existence of institutional controls is even more appropriate for TVA given that it is a federal entity. Maintenance of institutional controls of TVA's ISFSIs and their location are facilitated by the fact that TVA is a federal entity whose authority over TVA-controlled lands is mandated by the U.S. Congress. *See* 16 USCA § 831 et seq. Because it is a federal agency, institutional controls over TVA's facilities should endure well into the future.

C. Additional Factual Changes to DGEIS

TVA identified a few additional changes that should be made to the DGEIS to accurately reflect TVA's plants:

- DGEIS Table G-1 ("Capacity of Spent Fuel Pools for Operating Nuclear Power Reactors") should be revised to list Sequoyah as a site with a shared SFP.[148]

- DGEIS Table G-1 should be revised to list WBN as a site with a shared SFP.[149]

- DGEIS Table G-4 ("ISFSIs with General Licenses under Part 72") should be revised to change the System Design for Sequoyah from "HI-STORM 10" to "HI-STORM 100S."[150]

DB1/ 76796720.4

148 DGEIS at G-6.
149 *Id.* at G-7.
150 *Id.* at G-10.