

**NUCLEAR REGULATORY COMMISSION**

**10 CFR Part 51**

**[Docket Nos. PRM-51-29; NRC-2012-0215]**

**Rulemaking Petition to Rescind Regulations Making Generic Environmental  
Determinations Regarding Spent Fuel Pool Storage**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Petition for rulemaking; denial.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC) is denying a petition for rulemaking (PRM), PRM-51-29, submitted by the Commonwealth of Massachusetts (the Commonwealth or the petitioner). The petitioner requested that, in light of information gained from the Fukushima Dai-ichi accident, the NRC rescind its regulations that make a generic determination that spent fuel pool storage does not have a significant environmental impact for nuclear power plant license renewal actions. The NRC is denying the petition because the NRC finds no basis to consider a rulemaking to revise such regulations.

**DATES:** The docket for the petition for rulemaking, PRM-51-29, is closed on [INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

{pagination should be fixed in final version}

**ADDRESSES:** Please refer to Docket ID NRC-2012-0215 when contacting the NRC about the availability of information for this action. You may obtain publicly-available information related to this action by any of the following methods:

- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID NRC-2012-0215. Address questions about NRC dockets to Carol Gallagher; telephone: 301-287-3422; e-mail: [Carol.Gallagher@nrc.gov](mailto:Carol.Gallagher@nrc.gov). For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly-available documents online in the ADAMS Public Documents collection at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select "ADAMS Public Documents" and then select "[Begin Web-based ADAMS Search.](#)" For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov). The ADAMS accession number for each document referenced (if it is available in ADAMS) is provided the first time that it is mentioned in the SUPPLEMENTARY INFORMATION section. For the convenience of the reader, instructions about obtaining materials referenced in this document are provided in Section IV, Availability of Documents.

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

**FOR FURTHER INFORMATION CONTACT:** Jenny Tobin, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-2328; e-mail: [Jennifer.Tobin@nrc.gov](mailto:Jennifer.Tobin@nrc.gov).

## SUPPLEMENTARY INFORMATION:

### TABLE OF CONTENTS:

- I. The Petition.
- II. Reasons for Denial.
- III. Conclusion.
- IV. Availability of Documents.

#### I. The Petition.

On June 2, 2011, before the NRC's Atomic Safety and Licensing Board (ASLB), the Commonwealth of Massachusetts, Office of the Attorney General, Environmental Protection Division, requested a waiver of the NRC's generic determination regarding spent fuel pool (SFP) storage impacts in the Pilgrim nuclear power plant (NPP) license renewal proceeding. The petitioner also requested that, if the ASLB rejected the Commonwealth's waiver, then the NRC should consider the waiver request to be a petition for rulemaking. Specifically, the petitioner requested that the NRC's regulations in § 51.71(d)<sup>1</sup> of Title 10 of the *Code of Federal Regulations* (10 CFR) and table B-1<sup>2</sup> in appendix B to subpart A of 10 CFR part 51 be revised because these regulations, according to the petitioner, incorrectly "generically classify the environmental impacts of {remove extra spaces}

---

<sup>1</sup> 10 CFR 51.71 is entitled, "Draft environmental impact statement- contents;" section 51.71(d) describes the analysis required to be included in the draft EIS. For license renewal, the draft supplemental draft EIS (1) relies on supporting information in NUREG-1437, "Generic Environmental Impact Statement [GEIS] for License Renewal of Nuclear Plants" the GEIS for generic Category 1 issues and (2) provides an analysis of for the site-specific Category 2 issues.

<sup>2</sup> Table B-1 is entitled, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants," and is the codification of the GEIS. In table B-1, generic issues are designated as "Category 1" issues and site-specific issues are designated as "Category 2" issues.

high-density pool storage of spent fuel as insignificant and thereby permit their exclusion from consideration in environmental impact statements (EISs) for renewal of nuclear power plant operating licenses.”

The petitioner asserted that the Fukushima Dai-ichi accident provides “new and significant” information that would affect the NRC’s impact analysis for SFPs in license renewal. The petitioner contends that this event provides the justification for its request that the NRC revise 10 CFR 51.71(d) and table B-1 in appendix B to subpart A of 10 CFR part 51. The petitioner made the following three claims:

1. The impacts from the onsite storage of spent fuel are understated in NUREG-1437, “Generic Environmental Impact Statement [GEIS] for License Renewal of Nuclear Plants,” the license renewal GEIS analysis because the impacts caused by the Fukushima Dai-ichi event indicates that the probability-weighted consequences of a spent fuel pool accident are greater higher than what is described was considered in the GEIS.

2. The impacts from the onsite storage of spent fuel are understated in the license renewal GEIS analysis because the mitigation measures implemented at NPPs after the September 11, 2001 (9/11), terrorist attacks will not effectively mitigate the impacts of SFP accidents, given the new information gained from the Fukushima accident along with the NRC’s policy of imposing secrecy on the mitigation measures, and they the mitigation measures were improperly relied upon in the denial of PRM-51-10<sup>3</sup> on the same topic.

3. The license renewal GEIS impact analysis must address spent fuel storage impacts on a site-specific, rather than generic basis.

---

<sup>3</sup> The request presented issues raised in the petition are is essentially identical to the request presented arguments raised in another PRM submitted by the Commonwealth on August 25, 2006, PRM-51-10 (ADAMS Accession No. ML081890124). The State of California also submitted a nearly identical petition, PRM-51-12, in 2007 that was nearly identical to PRM-51-10. The NRC denied PRM-51-10 and PRM-51-12 on August 8, 2008 (73 FR 46204). The NRC’s denials of these two petitions were upheld. *New York v. U.S. Nuclear Regulatory Commission*, 589 F.3d 551 (2<sup>nd</sup> Cir. 2009). The arguments presented in support of PRM-51-10 are similar to those presented in support of this petition.

On December 13, 2011, the ASLB denied the Commonwealth's waiver petition (LBP-11-35). On March 8, 2012, in Memorandum and Order CLI-12-06, the Commission affirmed the ASLB's denial of the waiver request, and granted the Commonwealth's alternative request that its waiver request be treated as a PRM; the petition was referred to the NRC staff. The NRC assigned the petition Docket No. PRM-51-29. The NRC published a notice of receipt of the petition in the *Federal Register* (FR) on December 19, 2012 (77 FR 75065) and supplemented the notice on December 31, 2012 (77 FR 76952). The NRC did not request public comment on the petition because sufficient information was available for the NRC staff to form a technical opinion regarding the merits of the petition, which ~~was~~ **is** similar to the ~~arguments raised by the Commonwealth's in~~ **previous petition (PRM-51-10)**.

For the purposes of this review, the issues that the petitioner raised about the Pilgrim NPP licensing proceeding were considered generically, to the extent practicable. Other statements concerning the Pilgrim NPP license renewal proceeding, including those concerns related to the risk of severe reactor accidents, are beyond the scope of this PRM ~~pursuant to 10 CFR 2.802, and are not considered further.~~

## **II. Reasons for Denial.**

The NRC complies with Section 102(2) of **the National Environmental Policy Act of 1969 (NEPA)** in its consideration of NPP license renewal applications through the implementation of its environmental protection regulations in 10 CFR part 51. In accordance with 10 CFR 51.95(c), the NRC relies upon its environmental impact statement, NUREG-1437, "Generic Environmental Impact Statement [GEIS] for License Renewal of Nuclear Plants," as the basis for environmental reviews of NPP license renewal actions. The NRC published the GEIS in

May 1996 (1996 GEIS) and then revised and updated it in June 2013 (2013 GEIS).<sup>4</sup> ~~The 2013 GEIS considered the Fukushima events.~~ The GEIS reflects lessons learned and knowledge gained during previous license renewal environmental reviews and describes the potential environmental impacts of renewing the operating license of a NPP for up to an additional 20 years.

The findings of the GEIS have been codified into table B-1, “Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants,” in appendix B to subpart A of 10 CFR part 51.<sup>5</sup> **{merge this sentence with paragraph above}**

The NRC classifies the license renewal issues described in the GEIS as either generic or site-specific. Generic issues (i.e., environmental impacts common to all nuclear power plants) are addressed in the GEIS. Site-specific issues are addressed initially by the license renewal applicant (i.e., a nuclear power plant licensee seeking a renewal of its operating license under the NRC’s license renewal regulations in 10 CFR part 54) in its environmental report, which is required by 10 CFR 51.45, and then by the NRC in a supplemental environmental impact statement (SEIS) prepared for each license renewal application. The plant-specific SEIS and the GEIS, together, constitute the NRC’s NEPA analysis for any given NPP license renewal action. In table B-1, the “Onsite storage of spent nuclear fuel” issue has been classified as a Category 1, or generic, issue with an impact level finding of “small.” The “Onsite storage of spent nuclear fuel” finding states “[t]he expected increase in the volume of spent fuel from an

---

<sup>4</sup> The NRC’s regulations in 10 CFR 51.95(c) require, for the consideration of potential environmental impacts of renewing a NPP’s operating license under 10 CFR part 54, that the NRC prepare an environmental impact statement, which is a supplement to the 2013 GEIS. At the time the petition was filed in 2011, 10 CFR 51.95(c) referred to the initial 1996 GEIS. The NRC published a notice of issuance for the updated 2013 GEIS on June 20, 2013 (78 FR 37325).

<sup>5</sup> See *Baltimore Gas and Elec. Co. v. NRDC*, 462 U.S. 87, 100-01, 103 S. Ct. 2246 (1983) (upholds use of generic environmental analyses) and *Massachusetts v. NRC*, 708 F.3d 63, 68 (1<sup>st</sup> Cir. 2013) ~~citing *Baltimore Gas* at 104~~ (“the Supreme Court has held that the NRC is permitted to make generic determinations to meet its NEPA obligations”).

additional 20 years of operation can be safely accommodated onsite during the license renewal term with small environmental effects through dry or pool storage at all plants.” ~~Note that the~~ designation of an issue as a Category 1 (generic resolution) issue **in the GEIS** does not mean that potential impacts are **cannot be** considered **in a license renewal SEIS**. **If there are** **c**Changes in plant operating parameters or new and significant information pertinent to an evaluation of impacts, **these** are considered during preparation of plant-specific supplements to the NRC’s license renewal GEIS. ~~Therefore, the NRC’s classification of onsite storage of spent fuel as a Category 1 (i.e., generic) issue does not amount to a “spent fuel pool exclusion” as asserted by the petitioner.~~

Under 10 CFR part 51, neither the applicant’s environmental report nor the NRC’s SEIS are **is** required to address issues previously resolved generically, as set forth in the GEIS and table B-1, absent new and significant information. Section 51.92(a)(2) requires a supplement to an EIS if there is new and significant information relevant to environmental concerns and bearing on the license renewal or its impacts. The NRC standard for the evaluation of “new and significant” information is that the information must present “a seriously different picture of the environmental impact of the proposed project from what was previously envisioned.”<sup>6</sup>

---

<sup>6</sup> *Union Electric Company d/b/a Ameren Missouri (Callaway Plant, Unit 2), et al*, CLI-11-05, 74 NRC 141, 167-68 (2011) *quoting Hydro Resources, Inc.*, CLI-99-22, 50 NRC 3, 14 (1999) (alteration in the original) (supporting citations omitted) (“To merit this additional review, information must be both ‘new’ and ‘significant,’ and it must bear on the proposed action or its impacts. As we have explained, ‘[t]he new information must present ‘a seriously different picture of the environmental impact of the proposed project from what was previously envisioned.’”); *see also Sierra Club v. Froehlke*, 816 F.2d 205, 210 (5<sup>th</sup> Cir. 1987) (alteration added) (supporting citations omitted) (“In making its determination whether to supplement an existing EIS because of new information, the [United States Army, Corps of Engineers] should consider ‘the extent to which the new information presents a picture of the likely environmental consequences associated with the proposed action not envisioned by the original EIS.’”); *Wisconsin v. Weinberger*, 745 F.2d 412, 418 (7<sup>th</sup> Cir.1984) (supplementation required where new information “provides a seriously different picture of the environmental landscape.”).

Therefore, to be “significant,” any information must lead to a conclusion seriously different than that currently set forth in the GEIS.<sup>7</sup> **{merge this sentence with paragraph above}** Moreover, ~~the presence of “new and significant” information under NEPA does not compel an agency to engage in rulemaking, which is what the petitioner requests.<sup>8</sup> Unless expressly directed by statute, the decision to promulgate rulemaking is a discretionary one on the part of the agency.<sup>9</sup>~~

The petitioner claimed that the Fukushima nuclear accident, including possible damage to the SFP, provides new and significant information that requires the NRC to reconsider its impact findings in the license renewal GEIS. With respect to the March 2011 Fukushima accident, a Japanese government report, issued in June 2011, found that the Fukushima Dai-ichi, Unit 4 spent fuel pool, the one believed to have sustained the most serious damage, actually remained “nearly undamaged.”<sup>10</sup> The report noted that visual inspections found no water leaks or serious damage to the Unit 4 spent fuel pool. Additionally, on April 25, 2014, the NRC issued a report entitled, “NRC Overview of the Structural Integrity of the Spent Fuel Pool at Fukushima Dai-ichi, Unit 4.” The results indicated that the structural integrity of the Unit 4 spent fuel pool was sound.

---

<sup>7</sup> See Regulatory Guide 4.2, Supplement 1, Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses, Chapter 5 (September 2000), and Revision 1 published June 20, 2013 (78 FR 37324).

<sup>8</sup> ~~As a procedural statute, NEPA does not require an agency to amend its regulations, regardless of whether there is new and significant information that may lead to the supplementation of an agency's environmental impact statement. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350, 109 S. Ct. 1835, 1846 (1989) (“it is now well settled that NEPA itself does not mandate particular results, but simply prescribes the necessary process”).~~

<sup>9</sup> ~~See *Federal Maritime Com’n v. South Carolina State Ports Auth.*, 535 U.S. 743, 780, 122 S. Ct. 1864 (2002) quoting *SEC v. Chenery Corp.*, 332 U.S. 194, 203, 67 S. Ct. 1575 (1947) (“the choice made between proceeding by general rule or by individual, ad hoc litigation is one that lies primarily in the informed discretion of the administrative agency”).~~

<sup>10</sup> See “Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety-The Accident at TEPCO's Fukushima Nuclear Power Stations,” IV-91. English version available at [http://www.kantei.go.jp/foreign/kan/topics/201106/iaea\\_houkokusho\\_e.html](http://www.kantei.go.jp/foreign/kan/topics/201106/iaea_houkokusho_e.html), last visited on January 21 July 15, 2015.



With respect to the Fukushima event, the Commission has taken action to mitigate beyond design basis external events, including imposing new requirements to develop mitigating strategies for beyond design basis external events, to install hardened severe accident capable vents for boiling water reactors with Mark I and II containments, to install reliable SFP water level instrumentation, to re-evaluate seismic and flooding hazards, and to enhance emergency preparedness capabilities.<sup>11</sup>

The accident at the Fukushima Dai-ichi NPP in Japan led to additional questions about the safe storage of spent fuel and whether the NRC should require the expedited transfer of spent fuel from spent fuel pools to dry cask storage at nuclear power plants in the United States. This issue was identified by the NRC staff subsequent to the “Near-Term Task Force [NTTF] Review of Insights from the Fukushima Dai-ichi Accident” report. At the time this issue was identified, the NRC staff recognized that further study was needed to determine if regulatory action was warranted. On October 9, 2013, the NRC released a report, NUREG-2161, “Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor” (the “Spent Fuel Pool Study”). Additionally, the NRC conducted a regulatory analysis in COMSECY-13-0030, “Staff Evaluation and Recommendation for Japan Lessons Learned Tier 3 Issue on Expedited Transfer of Spent Fuel,” dated November 12, 2013 (COMSECY-13-0030). This study and the regulatory analysis concluded that SFPs are very robust structures with large safety margins, and that regulatory actions to reduce the amount of fuel in the spent fuel pool were not warranted. The Commission subsequently concluded in SRM-COMSECY-13-0030, issued on May 23, 2014, that further regulatory action need not be pursued in light of ~~citing~~ the low risk of accident for SFP storage.

---

<sup>11</sup> Order EA-12-051, NRC Order on Spent Fuel Pool Instrumentation, dated March 12, 2012; Order EA-12-049, NRC Order on Mitigating Strategies, dated March 12, 2012; Order EA-13-109, NRC Order on Severe Accident Capable Hardened Vents, dated June 6, 2013; 10 CFR 50.54(f) letters were issued on March 12, 2012, to NPP licensees for seismic/flooding re-evaluations and assessing emergency response capabilities.

As will be discussed in more detail in response to Issues 1 and 2, the event at Fukushima Dai-ichi does not provide any new and significant information that would have materially altered the conclusions in the GEIS, or in its underlying assumptions.<sup>12</sup> ~~Also, as noted above, even if the petitioner had demonstrated “new and significant” information under NEPA, this would not require rulemaking, which is what is requested by the petitioner. Unless expressly directed by statute, the decision to promulgate rulemaking is a discretionary one on the part of the agency.~~

In the petition, the Commonwealth raises three principal arguments; each is summarized and evaluated below.

**Issue 1: The Petitioner asserts that the impacts from the onsite storage of spent fuel are understated in the license renewal GEIS analysis because the impacts caused by the Fukushima Dai-ichi event indicates that the probability-weighted consequences of a spent fuel pool accident are higher greater than what is described was considered in the GEIS.**

The petitioner argued that the Fukushima event provided new and significant information challenging the generic conclusions in the license renewal GEIS. Specifically, the petitioner claimed that “the Fukushima accident shows . . . there is a substantial conditional probability of a pool fire during or following a reactor accident” and that “[t]his relationship between a pool fire and a core melt accident is not addressed in the License Renewal GEIS” or the denial of PRM 51-10 (73 FR 46204; August 8, 2008).<sup>13</sup> Further, the petitioner referenced a report by Dr.

---

<sup>12</sup> While the ASLB and Commission were principally concerned with the petitioner’s claims regarding reactor accidents, not SFP accidents (both were held to be out of scope of the Pilgrim NPP license renewal process), the condition of the SFP at Fukushima Dai-ichi, Unit 4, did not support the petitioner’s position that impacts from the earthquake constituted new and significant information. In LBP-11-35, the ASLB observed that the event at Fukushima did not demonstrate new and significant information in the Pilgrim NPP license renewal proceeding.

Gordon Thompson, “New and Significant Information from the Fukushima Dai-ichi Accident in the Context of Future Operation of the Pilgrim Nuclear Power Plant” (the “Thompson Report”), to support its argument that the GEIS understates the probability and impacts of an Pilgrim NPP SFP accident impacts, and by analogy, has so underestimated them generically.

#### *NRC Response to Issue 1*

The evaluation of the environmental impacts of the onsite storage of spent nuclear fuel during the license renewal term, including potential spent fuel pool accidents, was documented in the 1996 GEIS and reaffirmed in the 2013 GEIS. Based on this evaluation, the “Onsite storage of spent nuclear fuel” NEPA issue in table B-1 has been classified as a Category 1 issue, or as a generic issue, with an impact level finding of “small.”<sup>13</sup>

First, the petitioners’ assertion that the Fukushima event revealed a previously unconsidered aspect of spent fuel storage is incorrect. In response to PRM-51-10, the Commission rejected a similar argument regarding the probability “that a severe accident at the adjacent reactor would result in a SFP zirconium fire.”<sup>15</sup> The Commission noted that a series of unlikely events must occur for a severe reactor accident to lead to a spent fuel pool fire, including the accident itself, “[c]ontainment failure or bypass,” “[l]oss of SFP cooling,” “[e]xtreme radiation levels precluding personnel access,” “[i]nability to restart cooling or makeup systems

---

<sup>13</sup> PRM at 27 {renumber following footnotes}

<sup>13</sup> For most table B-1 NEPA issues, the NRC determined whether the impacts of license renewal would have a small, moderate, or large environmental impact. The statements of consideration for the June 20, 2013, rulemaking note that “[a] small impact means that the environmental effects are not detectable, or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource. A moderate impact means that the environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource. A large impact means that the environmental effects would be clearly noticeable and would be sufficient to destabilize important attributes of the resource” (78 FR 37,285).

<sup>15</sup> 73 FR at 46210.

<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> 2013 GEIS at E-38. {renumber following footnotes}

due to extreme radiation doses,” “[l]oss of most or all pool water through evaporation,” and “[i]nitiation of a zirconium fire in the SFP.”<sup>16</sup> As a result, the Commission concluded that “the probability of a SFP zirconium fire due to a severe reactor accident and subsequent containment failure would be well below the Petitioners’ 2E-5 per year estimate.”<sup>17</sup> The agency cited the denial of the petition for rulemaking in the 2013 update to the GEIS.<sup>18</sup> Thus, the Commission has previously considered the probability of a severe reactor accident causing a spent fuel pool fire and found it to be low. Petitioners have not demonstrated how information regarding the Fukushima accident provides a seriously different picture of this issue.

Moreover, the NRC has completed several studies of SFP safety, including NUREG-1353, “Regulatory Analysis for the Resolution of Generic Issue 82, ‘Beyond Design Basis Accidents in Spent Fuel Pools;” NUREG-1738, “Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants;” and NUREG-2161, “Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling-Water Reactor.” These studies have all concluded that SFPs continue to provide adequate protection of public health and safety and are consistent with the findings in the 2013 GEIS that onsite storage of spent fuel during the license renewal term would have a small impact on the environment. {relocated from below}

{start new paragraph} On September 19, 2014, the Commission published the “continued storage” final rule (formerly known as the “waste confidence rule,” 79 FR 56238) and its associated generic environmental impact statement (NUREG-2157, “Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel”), amending 10 CFR part 51.23 to revise the generic determination on the environmental impacts of continued storage of spent nuclear fuel beyond the licensed life for operation of a reactor. The final rule also makes conforming changes to the “Onsite storage of spent nuclear fuel” issue finding under the “Waste Management” section in table B–1 in appendix B to subpart A of 10 CFR part 51. finding-column

entry under the “Waste Management” section to address the issue of “Onsite storage of spent nuclear fuel.” The final rule revises the finding to address both the impacts of onsite storage during the license renewal term and adds generic determinations of the environmental impacts of continued storage of spent nuclear fuel beyond a reactor’s licensed life (i.e., those impacts that could occur as a result of the storage of spent nuclear fuel at at-reactor or away-from-reactor sites after a reactor has permanently shut down and until a permanent repository becomes available). The continued storage final rule affirms that the environmental impacts from the onsite storage of spent nuclear fuel, including potential spent fuel pool accidents, are small during the short-term storage timeframe (i.e., 60 years of continued storage after permanent shut down, after which the continued storage rule assumes that spent fuel will be moved to dry storage). This finding is consistent with the finding of the license renewal GEIS. Further, the Commission stated in the final rule that the direct and indirect environmental impacts of continued storage can be analyzed generically and that the impact determinations are not expected to differ from those that would result from individual site-specific reviews for the continued storage period. In reaching this result, the agency responded to a comment that suggested that the underlying analyses did not appropriately account for the possibility of a

severe reactor accident leading to a spent fuel pool accident.<sup>19</sup> The NRC disagreed with this comment, in part, based on the conservative aspects of the agency's previous studies of SFP accidents.<sup>20</sup>

~~The NRC has completed numerous studies of SFP safety, including NUREG-1353, "Regulatory Analysis for the Resolution of Generic Issue 82, 'Beyond Design Basis Accidents in Spent Fuel Pools,'" NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," and NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling-Water Reactor." These studies have all concluded that SFPs continue to provide adequate protection of public health and safety and are consistent with the findings in the 2013 GEIS that onsite storage of spent fuel has a small impact on the environment.~~ **{relocated above}**

As previously discussed, a report issued by the Japanese government in June 2011 found that the SFP at Fukushima Dai-ichi, Unit 4, the SFP which presented the highest safety concern among the SFPs, remained nearly undamaged. This report notes that from the analysis result of nuclides in the water extracted from the spent fuel pool, it appeared **see** that no extensive damage ~~in~~ **occurred to** the fuel rods ~~occurred~~. No serious damage to the pool, including water leaks, was found from visual inspections of the pool's condition. Additionally, on April 25, 2014, the NRC issued a report entitled, "NRC Overview of the Structural Integrity of the Spent Fuel Pool at Fukushima Dai-ichi, Unit 4." The results indicated that the structural integrity of the Unit 4 spent fuel pool was sound. ~~This contradicts the petitioner's suppositions regarding SFP damage at Fukushima.~~

---

<sup>19</sup> NUREG-2161 at D-438 to D-440.

<sup>20</sup> ***Id.* {renumber following footnotes}**

Consequently, the petitioners have not shown that the Fukushima event constitutes new and significant information regarding the probability of a SFP fire. For the reasons discussed above, the PRM does not provide a seriously different picture of the agency's previous analyses of a spent fuel pool accident, which have all concluded that despite the potential for large consequences of a severe spent fuel pool accident, the probability-weighted consequences are small due to the low probability of such an event.

**Issue 2: The Petitioner asserts that the impacts from the onsite storage of spent fuel are understated in the license renewal GEIS analysis because the mitigation measures implemented after the September 11, 2001 (9/11), terrorist attacks will not effectively mitigate the impacts of SFP accidents, given the new information gained from the Fukushima accident along with the NRC's policy of imposing secrecy on the mitigation measures, and they the mitigation measures were improperly relied upon in the denial of PRM-51-10 (73 FR 46204) on the same topic.**

The petitioner claimed that information about the Fukushima accident undermines the following two conclusions from the Commission's denial of PRM-51-10 (73 FR 46204; August 8, 2008): 1) post-9/11 mitigation measures relied upon by the NRC would permit recovery of lost water from spent fuel pools, and 2) the NRC's policy of imposing secrecy on these mitigation measures would not impair their effectiveness. With regard to the first ~~conclusion~~ **claim**, the petitioner ~~claimed~~ **argued** that lessons learned from the Fukushima Dai-ichi event undermine the Commission's reliance on post-9/11 mitigation measures that enable recovery of lost water from SFPs to prevent the onset of fire or other accidents, and that therefore, the Commission's denial of PRM-51-10 must be reconsidered. With regard to the second ~~conclusion~~ **claim**, the petitioner referenced statements in a declaration provided by Dr. Gordon Thompson that the

“NRC’s excessive secrecy degrades the licensee’s capability to mitigate an accident.” The petitioner asserted that by keeping the post-9/11 mitigation measures secret, “the NRC also raises the risk that first-responders from the surrounding community, who may be called upon to assist in the implementation of [the mitigation measures], will not have sufficient understanding of them to implement them effectively.”

The petitioner’s 2006 petition (PRM-51-10) requested changes to the Commission’s generic findings that **regarding** the environmental impacts from onsite spent fuel pool storage during the license renewal period of an operating NPP ~~are insignificant for SFP storage for the same reasons~~. In its denial (73 FR 46204; August 8, 2008), the NRC noted that spent fuel pools are “massive, extremely-robust structures designed to safely contain the spent fuel discharged from a nuclear reactor under a variety of normal, off-normal, and hypothetical accident conditions (e.g., loss of electrical power, floods, earthquakes, or tornadoes).”

The petitioner asserted that the Fukushima accident demonstrates that the conclusions in the denial of PRM-51-10 were incorrect, and that in light of the new information about the Fukushima event, the NRC should reevaluate its impact analysis in the license renewal GEIS because **the new information undermines the staff’s position that** the post-9/11 mitigation measures ~~are unable to~~ **would** prevent or reduce the impacts **the onset** of a spent fuel pool fire following an attack or other severe accident **by permitting recovery of lost water**.

#### *NRC Response to Issue 2*

The petitioner’s fundamental claim is that new and significant information from the Fukushima accident undermines the conclusions the Commission reached in denying PRM-51-10. ~~However, as~~ **As** previously discussed, a report issued by the Japanese government in June 2011 found that the SFP at Fukushima Dai-ichi, Unit 4, which presented the most safety concern, remained nearly undamaged. This report notes that no extensive damage in the fuel



rods appears to have occurred, based on an analysis of SFP water. No serious damage to the pool, including water leaks, was found from visual inspections of the pool's condition.

Additionally, on April 25, 2014, the NRC issued a report entitled, "NRC Overview of the Structural Integrity of the Spent Fuel Pool at Fukushima Dai-ichi, Unit 4." The results indicated that the structural integrity of the Unit 4 spent fuel pool was sound. ~~This contradicts the petitioner's and Dr. Thompson's suppositions regarding SFP damage at Fukushima.~~

As the Commission noted in its 2008 denial of PRM-51-10, and as demonstrated by NUREG-1738 and subsequent SFP studies: 1) spent fuel pools are robust structures capable of withstanding numerous hazards, 2) additional mitigation strategies are available to maintain cooling in the event of an incident that results in a loss of cooling water, and 3) the risk of SFP accidents is very low. Indeed, subsequent studies, such as NUREG-2161, conclude that spent fuel risks at the reference plant are very low. The Spent Fuel Pool Study also found that for the specific reference plant and earthquake analyzed, SFPs are likely to withstand severe earthquakes without leaking.

~~After the events of September 11, 2001, the Commission issued Order EA-02-026, "Order for Interim Safeguards and Security Compensatory Measures," dated February 25, 2002. Order EA-02-026 ultimately formed the basis of a new rulemaking, the Power Reactor Security Rule (74 FR 13926), which required commercial NPP licensees to, among other things, adopt strategies using readily available resources to maintain or restore core cooling, containment, and SFP cooling capabilities to cope with the loss of large areas of the facility due to large fires and explosions from any cause, including beyond design basis aircraft impacts. The final Power Reactor Security Rule codified this requirement in 10 CFR 50.54(hh) and also added several new requirements in 10 CFR part 73. This rulemaking considered insights gained from implementation of the security orders, reviews of site security plans, implementation of the~~

~~enhanced baseline inspection program, and updated the NRC's security regulatory framework for the licensing of new NPPs. Compliance with the final rule was required by March 31, 2010.~~

~~As previously discussed, NPPs are required to develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under circumstances associated with loss of large areas of the plant due to explosions or fire. The requirements are commonly known as "B.5.b Requirements" for the section of the Order in which they appear. These requirements stem from interim compensatory measures in Order EA-02-026, plant-specific license conditions, and 10 CFR 50.54(hh)(2), "Conditions of Licenses."~~

~~Regarding the petitioner's argument that the secrecy of the 9/11 mitigation measures impacts their effectiveness, as referenced in the petition, PRM 51-10 raised essentially identical arguments related to the B.5.b requirements. In the denial of that petition, the NRC noted that the B.5.b requirements are one part of the overall protective strategy of a NPP during an event. In particular, the NRC discussed the following in the denial of PRM 51-10 (73 FR 46204):~~

~~The NRC's regulations and security orders require licensees to develop security and training plans for NRC review and approval, implement procedures for these plans, and periodically demonstrate proficiency through tests and exercises. In addition, reactor physical security systems use a defense in depth concept, involving the following: 1) vehicle (external) barriers; 2) fences; 3) intrusion detection, alarm, and assessment systems; 4) internal barriers; 5) armed responders; 6) redundant alarm stations with command, control, and communications systems; 7) local law enforcement authority's response to a site and augmentation of the on-site armed response force; 8) security and emergency preparedness procedure development and planning efforts with local officials; and 9) security personnel training and qualification.~~

The NRC's regulatory approach for maintaining the safety and security of power reactors, and therefore SFPs, is based upon robust designs that are coupled with a strategic triad of preventive/protective systems, mitigative systems, and emergency-preparedness and response.

~~Furthermore, each licensee's security functions are integrated and coordinated with reactor operations and emergency response functions. Licensees develop protective strategies in order to meet the NRC design-basis threat (DBT). In addition, other Federal agencies, such as the Federal Aviation Administration, the Federal Bureau of Investigation, and the U.S. Department of Homeland Security have taken aggressive steps to prevent terrorist attacks in the United States. Lastly, a~~As noted in the Commission's denial of PRM-51-10 and PRM-51-12 (73 FR 46204), studies conducted by Sandia National Laboratories also confirmed the effectiveness of additional mitigation strategies to maintain spent fuel cooling in the event the pool is drained and its initial water inventory is reduced or lost entirely. Based on this more recent information, and the implementation of additional strategies following September 11, 2001, the probability, and accordingly, the risk, of a SFP zirconium fire initiation is expected to be less than reported in NUREG-1738 and previous studies. Taken as a whole, these systems, personnel, and procedures provide reasonable assurance that public health and safety, the environment, and the common defense and security will be adequately protected. **{start new paragraph with following sentence}**

In addition, following the Fukushima Dai-ichi event, the NRC issued Order EA-12-049, which requires, in part, that licensees establish plans and procedures associated with restoring and maintaining SFP cooling capability following a beyond-design-basis external event. These enhancements will provide additional capability for mitigating events that result in SFP draining, beyond those **already** required by ~~10 CFR 50.54(hh)(2)~~. **Therefore, as discussed above, the NRC does not simply rely on the post September 11, 2001, mitigating strategies to conclude the probability of an SFP accident is small. Rather, the NRC relies on the robust nature of the SFPs, the low probability of a SFP fire, and other mitigating measures, as well. Moreover, petitioners concede that measures to add water were ultimately successful at Fukushima, and**

observations to date have not revealed any cladding damage.<sup>21</sup> Consequently, the petitioner's provided no new information in PRM-51-29 regarding the effectiveness of measures does not present a seriously different picture of this issue that challenges these conclusions.

The petitioner also asserted that treating the mitigation measures as sensitive information impacts their effectiveness. Certain aspects of the enhancements are security-related and not publicly available, but in general include the following: 1) significant reinforcement of the defense capabilities for nuclear facilities; 2) better control of sensitive information; 3) enhancements in emergency preparedness to further strengthen the NRC's nuclear facility security program; and 4) implementation of mitigating strategies to deal with postulated events potentially causing loss of large areas of the plant due to explosions or fires, including those that an aircraft impact might create. These measures are outlined in greater detail in a memorandum to the Commission entitled, "Documentation of Evolution of Security Requirements at Commercial Nuclear Power Plants with Respect to Mitigation Measures for Large Fires and Explosions," dated February 4, 2010.

Plant-specific mitigation strategies are designated as security related information in accordance with the Commission's guidance in SECY-04-0191, "Withholding Sensitive Unclassified Information Concerning Nuclear Power Reactors From Public Disclosure." However, there is publicly-available, industry-developed guidance on implementing these requirements. Specifically, the NRC endorsed NEI 06-12, "B.5.b Phase 2 & 3 Submittal Guideline," in a letter from the NRC to NEI dated December 22, 2006. The NRC found NEI-06-12 as is a generally acceptable means for licensees to meet the NRC's requirements associated with mitigating potential loss of large areas due to fires or explosions, as explained in SECY-11-0125, "Issuance of Bulletin 2011-01, 'Mitigating Strategies.'" Thus, the agency has

---

<sup>21</sup> COMSECY-13-0030 at 2. {renumber following footnotes}

made substantial information available to the public regarding mitigation strategies. Moreover, petitioners have not alleged that the measures used to restore cooling to the SFPs during the Fukushima accident were developed under similar secret conditions or indicated how any such secrecy hindered the effectiveness of those measures.<sup>22</sup>

Because the petitioner has not provided new and significant information about the 9/11 mitigation measures with respect to the effectiveness of the measures to provide water to the SFPs, there is no need to supplement the GEIS.

**Issue 3: The license renewal GEIS impact analysis must address spent fuel storage impacts on a site-specific, rather than generic basis.**

The petitioner asserted that the NRC's generic findings in table B-1 in appendix B to subpart A of 10 CFR part 51 with respect to the Category 1 onsite storage of spent nuclear fuel issue would not be supportable where the Fukushima accident otherwise demonstrates that the environmental impacts could be significant, and argued that these impacts must be evaluated on a plant-specific Category 2 basis. The petitioner specifically argued that the NRC has not considered the new information previously presented by the petitioner in PRM-51-10 that contradicts the NRC's conclusions regarding the environmental impacts of the onsite storage of spent nuclear fuel.

*NRC Response to Issue 3*

Spent fuel storage impacts during the license renewal term of any renewed license was were evaluated in the 1996 GEIS, and The NRC staff concluded that the impacts would be

---

<sup>22</sup> E.g. Thompson Report at 21-23. {renumber following footnotes}

small for all plants, determined to have a small impact for all plants and, thus, the onsite storage of spent fuel during the license renewal term was designated a Category 1 issue for license renewal. The 2013 update to the GEIS from 2013 confirmed the 1996 evaluation. Specifically, the Commission concluded in the 1996 GEIS that continued storage of existing spent fuel and storage of spent fuel generated during the license renewal term can be accomplished safely and without significant environmental impacts, and as that radiation doses will be well within regulatory limits. The 2013 update to the GEIS confirmed the 1996 evaluation.

Further, the Commission affirmed the treatment of SFP storage impacts as Category 1 in 2008 upon denying the two petitions for rulemaking (PRM-51-10 and PRM-51-12) upon which PRM-51-29 is based (73 FR 46204). The two petitions requested that the NRC initiate a rulemaking concerning the environmental impacts of the high-density storage of spent nuclear fuel in SFPs. The two petitions asserted that “new and significant information” shows that the NRC incorrectly characterized the environmental impacts of high-density spent fuel storage as “insignificant” in the 1996 GEIS for the renewal of nuclear power plant licenses. Specifically, the petitioner at that time asserted that spent fuel stored in high-density SFPs is more vulnerable to a zirconium fire than the NRC concluded in its analysis in the 1996 GEIS. On August 8, 2008, the Commission denied the petitions, stating:

Based upon its review of the petitions, the NRC has determined that the studies upon which the Petitioners rely do not constitute new and significant information. The NRC has further determined that its findings related to the storage of spent nuclear fuel in pools, as set forth in NUREG-1437 and in Table B-1, of Appendix B to Subpart A of 10 CFR Part 51, remain valid. Thus, the NRC has met and continues to meet its obligations under NEPA. For the reasons discussed previously, the Commission denies PRM-51-10 and PRM-51-12<sup>14</sup>.

Likewise here, because the impacts from SFP storage have been consistently

---

<sup>14</sup> PRM-51-12 was a petition submitted by the State of California with spent fuel pool concerns similar to those of PRM-51-10, and the NRC evaluated and closed the two petitions together.

demonstrated to be small, ~~and consistently so,~~ and because the events in Japan do not challenge the NRC's assumptions or conclusions as to the applicability of its generic impact determination for spent fuel storage during license renewal, ~~as also affirmed in the 2013 update to the GEIS,~~ the NRC has determined that the petitioner's assertions ~~are not valid and~~ do not present ~~any~~ **an adequate** basis for the NRC to forego using a generic environmental analysis.

### **III. Conclusion.**

For the reasons described in Section II of this document, the NRC is denying the petition under 10 CFR 2.803. The petitioner did not present any information that would contradict conclusions reached by the Commission when it established or updated the license renewal rule, nor did the petitioner provide new and significant information to demonstrate that sufficient reason exists to revise the current regulations. The NRC elected not to ~~require~~ **request** public comments on PRM-51-29 because it had sufficient information to make a determination.

The events at the Fukushima Dai-ichi nuclear power plant have and will continue to inform improvements to the NRC's regulation of nuclear energy. Building upon the conclusions of the NTTF, the NRC is actively implementing significant enhancements through orders, rulemaking, and other regulatory initiatives. With regard to the petitioner's arguments that the events in Japan demonstrate that post-9/11 enhancements that enable the recovery of lost cooling water in SFPs will be ineffective, the petitioner did not provide **{delete extra space}** sufficient information to support this claim, especially in light of the Commission and other studies and experiences noted above. ~~Moreover, a Japanese government report found that the Fukushima Dai-ichi, Unit 4 spent fuel pool, had no water leaks or serious damage.~~

Therefore, the NRC denies the petitioner's request to revise regulations that make generic determinations about the environmental impacts of onsite spent fuel storage in license renewal environmental reviews.

#### IV. Availability of Documents.

The documents identified in the following table are available to interested persons as indicated. For more information on accessing ADAMS, see the ADDRESSES section of this document.

<b>Document {Ensure the table is updated}</b>	<b>ADAMS Accession Number/Federal Register Citation/URL {ensure that the three hyperlinks in the table are active}</b>
CLI-11-05, Union Electric Company d/b/a Ameren Missouri (Callaway Plant, Unit 2), September 9, 2011	<a href="http://www.nrc.gov/reading-rm/doc-collections/commission/orders/2011/2011-05cli.pdf">http://www.nrc.gov/reading-rm/doc-collections/commission/orders/2011/2011-05cli.pdf</a>
CLI-12-06, Commission Memorandum and Order, March 8, 2012	ML12068A187
CLI-99-22, Hydro Resources, Inc., July 23, 1999	<a href="http://www.nrc.gov/reading-rm/doc-collections/commission/orders/1999/1999-022cli.pdf">http://www.nrc.gov/reading-rm/doc-collections/commission/orders/1999/1999-022cli.pdf</a>
COMSECY-13-0030, "Staff Evaluation and Recommendation for Japan Lessons Learned Tier 3 Issue on Expedited Transfer of Spent Fuel," November 12, 2013	ML13329A918
Declaration of Dr. Gordon R. Thompson in Support of Commonwealth of Massachusetts' Contention and Related Petitions and Motions, June 1, 2011	ML111530345
Documentation of Evolution of Security Requirements at Commercial Nuclear Power Plants with Respect to Mitigation Measures for Large Fires and Explosions, February 4, 2010	ML092990438
<i>Federal Register</i> notice—Continued Storage of Spent Nuclear Fuel, September 19, 2014	79 FR 56238



<i>Federal Register</i> notice—Environmental Review for Renewal of Nuclear Power Plant Operating Licenses Final Rule, June 5, 1996	61 FR 28467
<i>Federal Register</i> notice—License Renewal of Nuclear Power Plants; Generic Environmental Impact Statement and Standard Review Plans for Environmental Reviews, Issuance of NUREG-1437 and NUREG-1555, June 20, 2013	78 FR 37325
<i>Federal Register</i> notice—Power Reactor Security Requirements Final Rule, March 27, 2009	74 FR 13926
<i>Federal Register</i> notice—PRM-51-10, NRC denial of Petition for Rulemaking, August 8, 2008	73 FR 46204
<i>Federal Register</i> notice—PRM-51-29, Commonwealth of Massachusetts, Notice of Receipt, December 19, 2012	77 FR 75065
<i>Federal Register</i> notice—PRM-51-29, Commonwealth of Massachusetts, Supplemental Information, December 31, 2012	77 FR 76952
<i>Federal Register</i> notice—Revisions to Environmental Review of Renewal of Nuclear Power Plant Operating Licenses Final Rule, June 20, 2013	78 FR 37282
Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437, Revision 1 (Volumes 1-3), June 21, 2013	ML13107A023
LBP-11-35, Memorandum and Order, denial of waiver in Pilgrim adjudicatory proceeding, December 13, 2011	ML11332A152
NEI 06-12, “B.5.b Phases 2 & 3 Submittal Guideline, Revision 2,” Project 689, December 14, 2006	ML070090060
NRC Overview of the Structural Integrity of the Spent Fuel Pool at Fukushima Dai-ichi, Unit 4, April 25, 2014	ML14111A099
NUREG-1353, “Regulatory Analysis for the Resolution of Generic Issue 82, ‘Beyond Design Basis Accidents in Spent Fuel Pools,’” April 30, 1989	ML082330232
NUREG-1437, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants” (2013 GEIS), June 20, 2013	ML13107A023
NUREG-1437, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants” (1996 GEIS; Volumes 1 and 2), May 31, 1996	ML040690705, ML040690738
NUREG-1738, “Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants,” S102686, February 28, 2001	ML010430066
NUREG-2157, “Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel”	ML14196A105, ML14196A107
NUREG-2161, “Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling-Water Reactor” (Spent Fuel Pool Study), October 9, 2013	ML14255A365
Order EA-02-026, “Order for Interim Safeguards and	ML020510635

Security Compensatory Measures,” February 25, 2002	
Order EA-12-049, NRC Order on Mitigating Strategies, March 12, 2012	ML12054A735
Order EA-12-051, NRC Order on Spent Fuel Pool Instrumentation, March 12, 2012	ML12056A044
Order EA-13-109, NRC Order on Severe Accident Capable Hardened Vents, June 6, 2013	ML13143A321
PRM-51-10, Commonwealth of Massachusetts, August 25, 2006	ML062640409
PRM-51-29, from Mathew Brock, Commonwealth Of Mass. Petition for Waiver of C.F.R. Part 51 Subpart A, Appendix B or In Alternative Petition For Rulemaking to Rescind Regulations Excluding Consideration Of Spent Fuel Storage Impacts, June 2, 2011	ML12254A005
Regulatory Guide 4.2, Supplement 1, Revision 1, “Preparation of Environmental Reports for Nuclear Power Plant License Renewal Applications,” June 20, 2013	ML13067A354
Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety-The Accident at TEPCO's Fukushima Nuclear Power Stations, June 2011	<a href="http://www.kantei.go.jp/foreign/kan/topics/201106/iaea_houkokusho_e.html">http://www.kantei.go.jp/foreign/kan/topics/201106/iaea_houkokusho_e.html</a>
Sandia Letter Report, Revision 2, Mitigation of Spent Fuel Pool Loss-of-Coolant Inventory Accidents And Extension of Reference Plant Analyses to Other Spent Fuel Pools, November 30, 2006	ML120970086
Sandia Report: MELCOR 1.8.5 Separate Effect Analysis of Spent Fuel Assembly Accident Response, June 30, 2003	ML062290362
SECY-04-0191, “Withholding Sensitive Unclassified Information Concerning Nuclear Power Reactors From Public Disclosure,” October 19, 2004	ML042310663
SECY-11-0093, “Enclosure: The Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident,” July 12, 2011	ML111861807
SECY-11-0125, “Issuance of Bulletin 2011-01, “Mitigating Strategies,” September 12, 2011	ML111250360
SRM-COMSECY-13-0030, Staff Evaluation and Recommendation for Japan Lessons-Learned Tier 3 Issue on Expedited Transfer of Spent Fuel, May 23, 2014	ML14143A360
The Thompson Report, “New And Significant Information From The Fukushima Daiichi Accident In The Context Of Future Operation Of The Pilgrim Nuclear Power Plant,” June 1, 2011	ML12094A183

Dated at Rockville, Maryland, this \_\_day of \_\_\_\_, 2015.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,  
Secretary of the Commission