

United States Court of Appeals For the First Circuit

No. 08-2267

Agency No. PRM-51-12

COMMONWEALTH OF MASSACHUSETTS

Petitioner

v.

US NUCLEAR REGULATORY COMMISSION; UNITED STATES

Respondents

CASE OPENING NOTICE

Issued: September 30, 2008

A petition for review was received and docketed today by the clerk of the court of appeals in compliance with Fed. R. App. P. 15. A copy of the petition is being transmitted to counsel for the respondent with this notice.

The administrative record, or certified list of all documents, must be filed by **November 10, 2008**. Fed. R. App. P. 17.

A notice advising you of the due date for filing your brief, and, if necessary, an appendix, will be sent upon the filing of the administrative record, or certified list, in this court.

An appearance form should be completed and returned immediately by any attorney who wishes to file pleadings in this court. 1st Cir. R. 12.0(a) and 46.0(a)(2). *Pro se* parties are not required to file an appearance form. Any attorney who has not been admitted to practice before the First Circuit Court of Appeals must submit an application and fee for admission with the appearance form. 1st Cir. R. 46.0(a)(2).

Dockets, opinions, rules, forms, attorney admission applications, the court calendar and general notices can be obtained from the court's website at www.ca1.uscourts.gov. Your attention is called specifically to the notices listed below:

- Notice to Counsel and Pro Se Litigants
- Notice Regarding Registration for Electronic Noticing
[<http://www.ca1.uscourts.gov/files/notices/ElectronicNoticingRegNotice.pdf>]

If you wish to inquire about your case by telephone, please contact the case manager at the direct extension listed below.

Richard Cushing Donovan, Clerk

UNITED STATES COURT OF APPEALS
FOR THE FIRST CIRCUIT
John Joseph Moakley
United States Courthouse
1 Courthouse Way, Suite 2500
Boston, MA 02210
Case Manager: Melinda McKenzie - (617) 748-4214

United States Court of Appeals For the First Circuit

NOTICE OF ELECTRONIC AVAILABILITY OF CASE INFORMATION

This Court's docket and opinions are available in electronic form, via WebPACER, on the Court's internet site at www.ca1.uscourts.gov. Although party filings are not typically posted on the Court's internet site, briefs filed with the Court are copied and posted to internet sites maintained by other organizations. Therefore, parties should not include in their public filings information that is too private or sensitive to include in an opinion or docket on the Court's internet site or in a brief posted on the internet.

Specifically, it is the policy of the U.S. Judicial Conference that parties not include, or partially redact where inclusion is necessary, the following personal data identifiers from documents being prepared for initial filing, particularly where those identifiers may be made available in electronic form:

- **Social Security Numbers.** If an individual's social security number must be included, only the last four digits of that number should be used.
- **Names of Minor Children.** If the involvement of a minor child must be mentioned, only the initials of that child should be used.
- **Dates of Birth.** If an individual's date of birth must be included, only the year should be used.
- **Financial Account Numbers.** If financial account numbers are relevant, only the last four digits of these numbers should be used.
- **Home Addresses in Criminal Cases.** If a home address must be included, only the city and state should be listed.

If the caption of the case contains any of the personal data identifiers listed above, the parties should file a motion to amend caption to redact the identifier.

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Parties should exercise caution in including other sensitive personal data in their filings, such as personal identifying numbers, medical records, employment history, individual financial information, proprietary or trade secret information, information regarding an individual's cooperation with the government, information regarding the victim of any criminal activity, national security information, and sensitive security information as described in 49 U.S.C. § 114.

Attorneys are urged to share this notice with their clients so that an informed decision can be made about inclusion of sensitive information. The clerk will not review filings for redaction. For further information, see <http://www.privacy.uscourts.gov/>.

cc:

Matthew T. Brock
John F. Cordes
Steven C. Hamrick
Michael B. Mukasey



THE COMMONWEALTH OF MASSACHUSETTS
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September 29, 2008

Richard Cushing Donovan, Clerk
United States Court of Appeals for the First Circuit
1 Courthouse Way, Suite 2500
Boston, MA 02110

Re: *Petition for Review of PRM 51-10, NRC-2006-0022 and PRM 51-12,
NRC-2007-0019
(U.S. Nuclear Regulatory Commission's Denial of Petitions for
Rulemaking)*

Dear Mr. Donovan:

Enclosed for filing please find:

1. An original and three copies of a Petition for Review, including a copy of the order issued by the U.S. Nuclear Regulatory Commission ("NRC") denying two petitions for rulemaking ("PRM"); PRM-51-10, by the Attorney General for the Commonwealth of Massachusetts, and PRM-51-12, by the Attorney General for the State of California;
2. Pursuant to F.R.A.P. 15(c) and 28 U.S.C. § 2344, two additional copies of the Petition for service by the Clerk's office on the NRC and the U.S. Attorney General.
3. Appearance form executed by counsel for the Commonwealth of Massachusetts;
4. The filing fee of \$450; payable to the Clerk, U.S. Court of Appeals.
5. Certificate of Service.

Pursuant to our call to your office, I understand that the Commonwealth does not need to file a Docketing Statement for this administrative appeal.



Richard Cushing Donovan, Clerk
September 29, 2008
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As attested in the attached Certificate of Service, copies of this Petition for Review and Notice of Appearance have been served on counsel for the following parties or interested persons who have participated in the related administrative proceedings below, including the license renewal hearings for the Vermont Yankee Nuclear Power Station and the Pilgrim Nuclear Power Station:

Atomic Safety and Licensing Board Panel for the Pilgrim Nuclear Power Station
Atomic Safety and Licensing Board Panel for the Vermont Yankee Power Station
Staff of the U.S. Nuclear Regulatory Commission
Entergy Nuclear Vermont Yankee, LLC, Entergy Nuclear Generation Company
and Entergy Nuclear Operations, Inc.
State of Vermont
State of New Hampshire
Town of Marlboro, Vermont
Town of Plymouth, Massachusetts
Town of Duxbury, Massachusetts
New England Coalition
Pilgrim Watch
The National Legal Scholars Law Firm
Attorneys General for the states of California, Connecticut, Illinois, Kentucky,
Louisiana, New Hampshire, New Jersey, New York and Vermont

Finally, I request that you stamp and return an additional copy of the Petition with the docket number for our files.

Thank you.

Sincerely,



Matthew Brock
Assistant Attorney General
Environmental Protection Division

cc: Service List

UNITED STATES COURT OF APPEALS
FOR THE FIRST CIRCUIT

COMMONWEALTH OF
MASSACHUSETTS,

Petitioner,

v.

UNITED STATES NUCLEAR REGULATORY
COMMISSION and the UNITED STATES
OF AMERICA,

Respondents

**PETITION FOR REVIEW OF U.S. NUCLEAR REGULATORY
COMMISSION DECISION TO DENY PETITIONS FOR
RULEMAKING PRM 51-10 and PRM 51-12**

Pursuant to F.R.A.P. 15 and 28 U.S.C. §§ 2342-2344, Petitioner, the Commonwealth of Massachusetts (“Commonwealth”), hereby petitions the Court for review of an order by the U.S. Nuclear Regulatory Commission (“NRC” or “Commission”). The NRC issued the order to deny a petition by the Commonwealth of Massachusetts for a rulemaking related to Entergy Nuclear Operations, Inc.’s and Entergy Nuclear Vermont Yankee LLC’s (collectively “Entergy’s”) applications for a 20-year extension of the licenses to operate the Pilgrim nuclear power plant in Plymouth, MA and the Vermont Yankee nuclear power plant in Vernon, Vermont. The State of

California filed a separate rulemaking petition that supported the Massachusetts rulemaking petition. In a single order, the NRC denied both petitions.

The Commonwealth seeks review of the following order:

- Nuclear Regulatory Commission Denial of Petitions for Rulemaking, Docket Nos. PRM-51-10 and PRM-51-12, 73 Federal Register 46,204 (August 8, 2008) (“Denial Decision”)(Attachment 1).

The Commonwealth contends that by denying the Commonwealth’s and California’s rulemaking petitions and refusing to address, either in a site specific environmental impact statement (“EIS”) as part of the relicensing process for the Pilgrim and Vermont Yankee nuclear power plants, or in a generic rulemaking EIS applicable to those plants, the environmental impacts of serious spent fuel pool accidents caused by a wide range of factors including terrorist attacks, natural phenomena, operator error, and equipment failure, the NRC violated the Atomic Energy Act, the National Environmental Policy Act, the Administrative Procedure Act, and NRC regulations for implementation of those statutes.

Therefore, the Commonwealth asks this Court to:

- (a) review and reverse the Denial Decision;

(b) order the NRC to prepare an EIS, with opportunity for public comment, applicable to the Pilgrim and Vermont Yankee nuclear power plants that addresses the environmental impacts of serious spent fuel pool accidents caused by a wide range of factors including terrorist attacks, natural phenomena, operator error, and equipment failure;

(c) declare that the NRC may not permit Entergy to continue to operate the Pilgrim and Vermont Yankee nuclear power plants past the expiration of their current licenses in 2012 unless and until the NRC fully complies with its statutory and regulatory obligations for the renewal of the licenses, including completion of the EIS; and

(d) grant such other relief as the Court may deem appropriate.

Respectfully submitted,

By its Attorneys,

MARTHA COAKLEY
ATTORNEY GENERAL



Matthew Brock, Assistant Attorney General
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September 27, 2008

Proposed Rules

Federal Register

Vol. 73, No. 154

Friday, August 8, 2008

This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rule making prior to the adoption of the final rules.

NUCLEAR REGULATORY COMMISSION

10 CFR Part 51

[Docket No. PRM-51-10, NRC-2006-0022 and Docket No. PRM-51-12, NRC-2007-0019]

The Attorney General of Commonwealth of Massachusetts, The Attorney General of California; Denial of Petitions for Rulemaking

AGENCY: Nuclear Regulatory Commission (NRC).

ACTION: Petition for rulemaking; denial.

SUMMARY: The NRC is denying two petitions for rulemaking (PRM), one filed by the Attorney General of the Commonwealth of Massachusetts (Massachusetts AG) and the other filed by the Attorney General for the State of California (California AG), presenting nearly identical issues and requests for rulemaking concerning the environmental impacts of the high-density storage of spent nuclear fuel in large water pools, known as spent fuel pools (SFPs). The Petitioners asserted that "new and significant information" shows that the NRC incorrectly characterized the environmental impacts of high-density spent fuel storage as "insignificant" in its National Environmental Policy Act (NEPA) generic environmental impact statement (EIS) for the renewal of nuclear power plant licenses. Specifically, the Petitioners asserted that spent fuel stored in high-density SFPs is more vulnerable to a zirconium fire than the NRC concluded in its NEPA analysis.

ADDRESSES: You can access publicly available documents related to these petitions for rulemaking using the following methods:

Federal e-Rulemaking Portal: Go to <http://www.regulations.gov> and search for documents filed under Docket ID [NRC-2006-0022] (PRM-51-10), and [NRC-2007-0019] (PRM-51-12).

NRC's Public Document Room (PDR): The public may examine and have copied for a fee publicly available

documents at the NRC's PDR, Public File Area O1 F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland.

NRC's Agencywide Documents Access and Management System (ADAMS): Publicly available documents created or received at the NRC are available electronically at the NRC's electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. From this page, the public can gain entry into ADAMS, which provides text and image files of NRC's public documents. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC PDR reference staff at 1-899-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov.

FOR FURTHER INFORMATION CONTACT: L. Mark Padovan, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-1423, e-mail Mark.Padovan@nrc.gov.

SUPPLEMENTARY INFORMATION:

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I. Background

The NRC received two PRMs requesting that Title 10 of the Code of Federal Regulations (10 CFR), Part 51, be amended. The Massachusetts AG filed its petition on August 25, 2006 (docketed by the NRC as PRM-51-10). The NRC published a notice of receipt and request for public comment in the **Federal Register** on November 1, 2006 (71 FR 64169). The California AG filed its petition on March 16, 2007 (docketed by the NRC as PRM-51-12). PRM-51-12 incorporates by reference the facts and legal arguments set forth in PRM-51-10. The NRC published a notice of receipt and request for public comment on PRM-51-12 in the **Federal Register** on May 14, 2007 (72 FR 27068). The California AG filed an amended petition (treated by the NRC as a supplement to PRM 51-12) on September 19, 2007, to clarify its rulemaking request. The NRC published a notice of receipt for the supplemental petition in the **Federal Register** on November 14, 2007 (72 FR 64003). Because of the similarities of PRM-51-10 and PRM-51-12, the NRC evaluated the two petitions together.

The Petitioners asserted the following in their petitions:

1. "New and significant information" shows that the NRC incorrectly characterized the environmental impacts of high-density spent fuel storage as "insignificant" in the NRC's NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, May 1996. Specifically, the Petitioners asserted that an accident or a malicious act, such as a terrorist attack, could result in an SFP being drained, either partially or completely, of its cooling water. The Petitioners further asserted that this drainage would then cause the stored spent fuel assemblies to heat up and then ignite, with the resulting zirconium fire releasing a substantial amount of radioactive material into the environment.

2. The bases of the "new and significant information" are the following:

a. NUREG-1738, *Technical Study of the Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants*, January 2001

b. National Academy of Sciences Committee on the Safety and Security of Commercial Spent Nuclear Fuel Storage, *Safety and Security of Commercial*

Spent Nuclear Fuel Storage (National Academies Press: 2006) (NAS Report)

c. Gordon R. Thompson, "Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants," May 25, 2006 (Thompson Report)

3. Specifically, the Petitioners asserted that the "new and significant" information shows the following:

a. The fuel will burn if the water level in an SFP drops to the point where the tops of the fuel assemblies are uncovered (complete or partial water loss resulting from SFP drainage being caused by either an accident or terrorist attack).

b. The fuel will burn regardless of its age.

c. The zirconium fire will propagate to other assemblies in the pool.

d. The zirconium fire may be catastrophic.

e. A severe accident caused by an intentional attack on a nuclear power plant SFP is "reasonably foreseeable."

The Petitioners also asserted that new and significant information shows that the radiological risk of a zirconium fire in a high-density SFP at an operating nuclear power plant can be comparable to, or greater than, the risk of a core-degradation event of non-malicious origin (i.e., a "severe accident") at the plant's reactor. Consequently, the Petitioners asserted that SFP fires must be considered within the body of severe accident mitigation alternatives (SAMAs).

II. Petitioners' Requests

PRM-51-10 requested that the NRC take the following actions:

1. Consider new and significant information showing that the NRC's characterization of the environmental impacts of spent fuel storage as insignificant in NUREG-1437 is incorrect.

2. Revoke the regulations which codify that incorrect conclusion and excuse consideration of spent fuel storage impacts in NEPA decision-making documents, namely, 10 CFR 51.53(c)(2), 51.95(c) and Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants," of appendix B to subpart A of 10 CFR Part 51. Further, revoke 10 CFR 51.23(a) and (b), 51.30(b), 51.53, 51.61, and 51.80(b) to the extent that these regulations find, imply, or assume that environmental impacts of high-density pool storage are insignificant, and therefore need not be considered in any plant-specific NEPA analysis.

3. Issue a generic determination that the environmental impacts of high-

density pool storage of spent fuel are significant.

4. Require that any NRC licensing decision that approves high-density pool storage of spent fuel at a nuclear power plant, or any other facility, must be accompanied by a plant-specific EIS that addresses the environmental impacts of high-density pool storage of spent fuel at that nuclear plant and a reasonable array of alternatives for avoiding or mitigating those impacts.

5. Amend its regulations to require that SAMAs that must be discussed in utility company environmental reports (ERs) and NRC supplemental EISs for individual plants under 10 CFR 51.53(c)(3)(ii)(L) and Table B-1 of appendix B to subpart A of 10 CFR part 51 ("Postulated Accidents: Severe Accidents") must include alternatives to avoid, or mitigate, the impacts of high-density pool zirconium fires.

PRM-51-12 incorporates by reference PRM-51-10. PRM-51-12 requested that the NRC take the following actions:

1. Rescind all NRC regulations found in 10 CFR part 51 that imply, find, or determine that the potential environmental effects of high-density pool storage of spent nuclear fuel are not significant for purposes of NEPA and NEPA analysis.

2. Adopt, and issue, a generic determination that approval of such storage at a nuclear power plant, or any other facility, does constitute a major federal action that may have a significant effect on the human environment.

3. Require that no NRC licensing decision that approves high-density pool storage of spent nuclear fuel at a nuclear power plant, or other storage facility, may issue without the prior adoption and certification of an EIS that complies with NEPA in all respects, including full identification, analysis, and disclosure of the potential environmental effects of such storage, including the potential for accidental or deliberately caused release of radioactive products to the environment, whether by accident or through acts of terrorism, as well as full and adequate discussion of potential mitigation for such effects, and full discussion of an adequate array of alternatives to the proposed storage project.

III. Public Comments

The NRC's notice of receipt and request for public comment invited interested persons to submit comments. The comment period for PRM 51-10 originally closed on January 16, 2007, but was extended through March 19, 2007. The public comment period for

PRM 51-12 closed on July 30, 2007.

Accordingly, the NRC considered comments received on both petitions through the end of July 2007. The NRC received 1,676 public comments, with 1,602 of these being nearly identical form e-mail comments supporting the petitions. Sixty-nine other comments also support the petitions. These comments were submitted by States, private organizations, and members of the U.S. Congress. Two letters from the Nuclear Energy Institute (NEI) oppose the petitions, and three nuclear industry comments endorse NEI's comments.

In general, the comments supporting the petitions focused on the following main elements of the petitions:

- NRC should evaluate the environmental impacts (large radioactive releases and contamination of vast areas) of severe accidents and intentional attacks on high-density SFP storage in its licensing decisions (NEPA analysis).

- The 2006 decision of the United States Court of Appeals for the Ninth Circuit, *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), cert. denied 127 S. Ct. 1124 (2007), concluded that the NRC must evaluate the environmental impacts of a terrorist attack on SFP storage in its licensing decisions.

- NRC's claim that the likelihood of a SFP zirconium fire is remote is incorrect. Partial loss of water in an SFP could lead to a zirconium fire and release radioactivity to the environment.

- NRC's characterization of the environmental impacts of high-density SFP storage as "insignificant" in NUREG-1437 is incorrect, and the NRC should revoke the regulations which codify this.

- Any licensing decision approving high-density spent fuel storage should have an EIS.

Comments opposing the petitions centered on the following:

- Petitioners failed to show that regulatory relief is needed to address "new and significant" information concerning the potential for spent fuel zirconium fires in connection with high-density SFP storage. None of the documents that the Petitioners cited or referenced satisfy the NRC's standard for new and significant information.

- Petitioners failed to show that the Commission should rescind its Waste Confidence decision codified at 10 CFR 51.23, or change its determination that the environmental impacts of high-density spent fuel storage are insignificant.

- The Commission has recently affirmed its longstanding view that NEPA demands no terrorism inquiry,

and that the NRC therefore need not consider the environmental consequences of hypothetical terrorist attacks on NRC-licensed facilities.

• The Commission's rejection of the Ninth Circuit Court's view is consistent with the U.S. Supreme Court's position that NEPA should not be read to force agencies to consider environmental impacts for which they cannot reasonably be held responsible. Moreover, the NRC has, in fact, examined terrorism under NEPA and found the impacts similar to the impacts of already-analyzed, severe reactor accidents.

The NRC reviewed and considered the comments in its decision to deny both petitions, as discussed in the following sections:

IV. NEPA and NUREG-1437

The NRC's environmental protection regulations in 10 CFR Part 51 identify renewal of a nuclear power plant operating license as a major federal action significantly affecting the quality of the human environment. As such, an EIS is required for a plant license renewal review in accordance with the NEPA. The Petitioners challenge NUREG-1437, which generically assesses the significance of various environmental impacts associated with the renewal of nuclear power plant licenses. NUREG-1437 summarizes the findings of a systematic inquiry into the potential environmental consequences of operating individual nuclear power plants for an additional 20 years. The findings of NUREG-1437 are codified in Table B-1 of appendix B to subpart A of 10 CFR part 51.

The NUREG-1437 analysis identifies the attributes of the nuclear power plants, such as major features and plant systems, and the ways in which the plants can affect the environment. The analysis also identifies the possible refurbishment activities and modifications to maintenance and operating procedures that might be undertaken given the requirements of the safety review as provided for in the NRC's nuclear power plant license renewal regulations at 10 CFR part 54.

NUREG-1437 assigns one of three impact levels (small, moderate, or large) to a given environmental resource (e.g., air, water, or soil). A small impact means that the environmental effects are not detectable, or are so minor that they will 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 to destabilize, important attributes of the resource. A large impact means that the

environmental effects are clearly noticeable, and are sufficient to destabilize important attributes of the resource.

In addition to determining the significance of environmental impacts associated with license renewal, the NRC determined whether the analysis in NUREG-1437 for a given resource can be applied to all plants. Under the NUREG-1437 analysis, impacts will be considered Category 1 or Category 2. A Category 1 determination means that the environmental impacts associated with that resource are generic (i.e., the same) for all plants. A Category 2 determination means that the environmental impacts associated with that resource cannot be generically assessed, and must be assessed on a plant-specific basis.

The NRC regulations at 10 CFR part 51, subpart A, appendix B, Table B-1 and NUREG-1437 set forth three criteria for an issue to be classified as Category 1. The first criterion is that the environmental impacts associated with that resource have been determined to apply to all plants. The second criterion is that a single significance level (i.e., small, moderate, or large) has been assigned to the impacts.¹ The third criterion is that the mitigation of any adverse impacts associated with the resource has been considered in NUREG-1437 and further, it has been determined that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation. For Category 1 issues, the generic analysis may be adopted in each plant-specific license renewal review.

A Category 2 classification means that the NUREG-1437 analysis does not meet the criteria of Category 1. Thus, on that particular environmental issue, additional plant-specific review is required and must be analyzed by the license renewal applicant in its ER.

For each license renewal application, the NRC will prepare a draft supplemental EIS (SEIS) to analyze those plant-specific (Category 2) issues. Neither the SEIS nor the ER is required to cover Category 1 issues. However, both are required to consider any new and significant information for Category 1 or unidentified issues. The draft SEIS is made available for public comment. After considering public comments, the NRC will prepare and issue the final SEIS in accordance with 10 CFR 51.91 and 51.93. The final SEIS and NUREG-

¹ A note to Table B-1 states that significance levels have not been assigned "for collective off site radiological impacts from the fuel cycle and from high level waste and spent fuel disposal." 10 CFR part 51, subpart A, app. B, Table B-1, n. 2.

1437, together, serve as the requisite NEPA analysis for any given license renewal application.

The NUREG-1437 analysis, as shown in Table B-1 of appendix B to subpart A of 10 CFR part 51, found that the environmental impact of the storage of spent nuclear fuel, including high-density storage, in SFPs, during any plant refurbishment or plant operation through the license renewal term, are of a small significance level and meet all Category 1 criteria. It is this finding that the Petitioners challenge. After reviewing the petitions and the public comments received, the NRC has determined that its findings in NUREG-1437 and in Table B-1 remain valid, both for SFP accidents and for potential terrorist attacks that could result in an SFP zirconium fire.

V. Reasons for Denial—General

A. Spent Fuel Pools

Spent nuclear fuel offloaded from a reactor is stored in a SFP. The SFPs at all nuclear plants in the United States 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). SFPs are made of thick, reinforced, concrete walls and floors lined with welded, stainless-steel plates to form a leak-tight barrier. Racks fitted in the SFPs store the fuel assemblies in a controlled configuration (i.e., so that the fuel is both sub-critical and in a coolable geometry). Redundant monitoring, cooling, and makeup-water systems are provided. The spent fuel assemblies are positioned in racks at the bottom of the pool, and are typically covered by at least 25 feet of water. SFPs are essentially passive systems.

The water in the SFPs provides radiation shielding and spent fuel assembly cooling. It also captures radionuclides in case of fuel rod leaks. The water in the pool is circulated through heat exchangers for cooling. Filters capture any radionuclides and other contaminants that get into the water. Makeup water can also be added to the pool to replace water loss.

SFPs are located at reactor sites, typically within the fuel-handling (pressurized-water reactor) or reactor building (boiling-water reactor). From a structural point of view, nuclear power plants are designed to protect against external events such as tornadoes, hurricanes, fires, and floods. These structural features, complemented by the deployment of effective and visible

physical security protection measures, are also deterrents to terrorist activities. Additionally, the emergency procedures and SAMA guidelines developed for reactor accidents provide a means for mitigating the potential consequences of terrorist attacks.

B. Physical Security

The Petitioners raise the possibility of a successful terrorist attack as increasing the probability of an SFP zirconium fire. As the NAS Report found, the probability of terrorist attacks on SFPs cannot be reliably assessed, quantitatively or comparatively. The NRC has determined, however, that security and mitigation measures the NRC has imposed upon its licensees since September 11, 2001, and national anti-terrorist measures to prevent, for example, aircraft hijackings, coupled with the robust nature of SFPs, make the probability of a successful terrorist attack, though numerically indeterminate, very low.

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 to periodically demonstrate proficiency through tests and exercises.² In addition, reactor physical security systems use a defense-in-depth concept, involving the following:

- Vehicle (external) barriers.
- Fences.
- Intrusion detection, alarm, and assessment systems.
- Internal barriers.
- Armed responders.
- Redundant alarm stations with command, control, and communications systems.
- Local law enforcement authority's response to a site and augmentation of the on-site armed response force.
- Security and emergency-preparedness procedure development and planning efforts with local officials.
- Security personnel training and qualification.

The NRC's regulatory approach for maintaining the safety and security of power reactors, and thus 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).³ In addition, other Federal agencies such as the Federal Aviation Administration, the Federal Bureau of Investigation, and the Department of Homeland Security have taken aggressive steps to prevent terrorist attacks in the United States. 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.

C. Very Low Risk

Risk is defined as the probability of the occurrence of a given event multiplied by the consequences of that event.⁴ Studies conducted over the last three decades have consistently shown that the probability of an accident causing a zirconium fire in an SFP to be lower than that for severe reactor accidents. The risk of beyond design-basis accidents (DBAs) in SFPs was first examined as part of the landmark *Reactor Safety Study: An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants* (WASH-1400, NUREG-75/014, 1975), and was found to be several orders of magnitude below those involving the reactor core. The risk of an SFP accident was re-examined in the 1980's as Generic Issue 82, *Beyond Design Basis Accidents in Spent Fuel Pools*, in light of increased use of high-density storage racks and laboratory studies that indicated the possibility of zirconium fire propagation between assemblies in an air-cooled environment. The risk assessment and cost-benefit analyses developed through this effort, NUREG-1353, *Regulatory Analysis for the Resolution of Generic Issue 82, Beyond Design Basis Accidents in Spent Fuel Pools*, Section 6.2, April 1989, concluded that the risk of a severe accident in the SFP was low and "appear[s] to meet" the objectives of the Commission's "Safety Goals for the Operations of Nuclear Power Plants; Policy Statement," (August 4, 1986; 51

FR 28044), as amended (August 21, 1986; 51 FR 30028), and that no new regulatory requirements were warranted.⁵

SFP accident risk was re-assessed in the late 1990s to support a risk-informed rulemaking for permanently shutdown, or decommissioned, nuclear power plants. The study, NUREG-1738, *Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants*, January 2001, conservatively assumed that if the water level in the SFP dropped below the top of the spent fuel, an SFP zirconium fire involving all of the spent fuel would occur, and thereby bounded those conditions associated with air cooling of the fuel (including partial-draindown scenarios) and fire propagation. Even when all events leading to the spent fuel assemblies becoming partially or completely uncovered were assumed to result in an SFP zirconium fire, the study found the risk of an SFP fire to be low and well within the Commission's Safety Goals.

Furthermore, significant additional analyses have been performed since September 11, 2001, that support the view that the risk of a successful terrorist attack (i.e., one that results in an SFP zirconium fire) is very low. These analyses were conducted by the Sandia National Laboratories and are collectively referred to herein as the "Sandia studies."⁶ The Sandia studies

⁵ The Commission's Safety Goals identified two quantitative objectives concerning mortality risks: (1) The risk to an average individual in the vicinity of a nuclear power plant of prompt fatalities that might result from reactor accidents should not exceed one-tenth of one percent (0.1 percent) of the sum of prompt fatality risks resulting from other accidents in which members of the U.S. population are generally exposed; and (2) The risk to the population in the area near a nuclear power plant of cancer fatalities that might result from nuclear power plant operation should not exceed one-tenth of one percent (0.1 percent) of the sum of cancer fatality risks resulting from all other causes.

⁶ Sandia National Laboratories, "Mitigation of Spent Fuel Pool Loss-of-Coolant Inventory Accidents and Extension of Reference Plant Analyses to Other Spent Fuel Pools," Sandia Letter Report, Revision 2 (November 2006) incorporates and summarizes the Sandia Studies. This document is designated "Official Use Only—Security Related Information." A version of the Sandia Studies, with substantial redactions, was made public as a response to a Freedom of Information Act request. It is available on the NRC's Agencywide Document Access and Management System (ADAMS). The redacted version can be found under ADAMS Accession No. ML062290362. For access to ADAMS, contact the NRC Public Document Room Reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. For additional related information, please see the NRC fact sheet "NRC Review of Paper on Reducing Hazards From Stored Spent Nuclear Fuel," which is available on the NRC's public Web site at: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/reducing-hazards-spent-fuel.html>.

² For additional related information, please see the NRC fact sheet "NRC Review of Paper on Reducing Hazards From Stored Spent Nuclear Fuel," which is available on the NRC's public Web site at: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/reducing-hazards-spent-fuel.html>.

³ The DBT represents the largest threat against which a private sector facility can be reasonably expected to defend with high assurance. The NRC's DBT rule was published in the Federal Register on March 19, 2007 (72 FR 12705).

⁴ The American Society of Mechanical Engineers (ASME) "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," ASME RA-S-2002, defines risk as the probability and consequences of an event, as expressed by the risk "triplet" that is the answer to the following three questions: (1) What can go wrong? (2) How likely is it? and (3) What are the consequences if it occurs?

are sensitive security related information and are not available to the public. The Sandia studies considered spent fuel loading patterns and other aspects of a pressurized-water reactor SFP and a boiling-water reactor SFP, including the role that the circulation of air plays in the cooling of spent fuel. The Sandia studies indicated that there may be a significant amount of time between the initiating event (i.e., the event that causes the SFP water level to drop) and the spent fuel assemblies becoming partially or completely uncovered. In addition, the Sandia studies indicated that for those hypothetical conditions where air cooling may not be effective in preventing a zirconium fire (i.e., the partial drain down scenario cited by the Petitioners), there is a significant amount of time between the spent fuel becoming uncovered and the possible onset of such a zirconium fire, thereby providing a substantial opportunity for both operator and system event mitigation.

The Sandia studies, which more fully account for relevant heat transfer and fluid flow mechanisms, also indicated 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 previously considered (e.g., in NUREG-1738). Thus, the fuel is more easily cooled, and the likelihood of an SFP fire is therefore reduced.

Additional mitigation strategies implemented subsequent to September 11, 2001, enhance spent fuel coolability and the potential to recover SFP water level and cooling prior to a potential SFP zirconium fire. The Sandia studies 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.

Given the physical robustness of SFPs, the physical security measures, and SFP mitigation measures, and based upon NRC site evaluations of every SFP in the United States, the NRC has determined that the risk of an SFP zirconium fire, whether caused by an accident or a terrorist attack, is very low. As such, the NRC's generic findings in NUREG-1437, as further reflected in Table B-1 of appendix B to subpart A of 10 CFR part 51, remain valid.

VI. Reasons for Denial—NRC Responses to Petitioners' Assertions

A. New and Significant Information

The Petitioners asserted that new and significant information shows that the NRC incorrectly characterized the environmental impacts of spent fuel storage as "insignificant." The information relied upon by the Petitioners, however, is neither "new" nor "significant," within the NRC's definition of those terms. The NRC defines these terms in its Supplement 1 to NRC Regulatory Guide 4.2, *Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses*, Chapter 5 (September 2000) (RG 4.2S1). "New and significant" information, which would require supplementing NUREG-1437, is defined as follows:

(1) Information that identifies a significant environmental issue that was not considered in NUREG-1437 and, consequently, not codified in Appendix B to Subpart A of 10 CFR Part 51, or

(2) Information that was not considered in the analyses summarized in NUREG-1437 and that leads to an impact finding different from that codified in 10 CFR Part 51.

The Petitioners' "new and significant" information does not meet the RG 4.2S1 criteria. NUREG-1437 (Sections 6.4.6.1. to 6.4.6.3.), and the analyses cited therein, including the NRC's "Waste Confidence Rule" (September 18, 1990; 55 FR 38474, 38480-81), extensively considered the risk of SFP accidents. Moreover, to the extent any information submitted by the Petitioners was not considered in NUREG-1437, none of the information is "significant," because, as explained further in this document, it would not lead to "an impact finding different from that codified in 10 CFR Part 51," or as set forth in NUREG-1437.

B. Spent Fuel Assemblies Will Burn If Uncovered

The Petitioners asserted that new and significant information, consisting primarily of the Thompson Report, NUREG-1738, and a government-sponsored study, the NAS Report, show that spent fuel will burn if the water level in an SFP drops to the point where the tops of the fuel assemblies are uncovered. Specifically, the Petitioners asserted that the NRC fails to recognize the danger of a partial loss of water in an SFP, which in the Petitioners' view, is more likely to cause an SFP zirconium fire than a complete loss of water, because the remaining water will block the circulating air that would

otherwise act to cool the spent fuel assemblies.

The NRC does not agree with the Petitioners' assertions. The NRC has determined that a zirconium cladding fire does not occur when only the tops of the fuel assemblies are uncovered. In reality, a zirconium fire cannot occur unless fuel uncovering is more substantial. Even then, the occurrence of a zirconium fire requires a number of conditions which are extremely unlikely to occur together. The Sandia studies provide a more realistic assessment of the coolability of spent fuel under a range of conditions and a better understanding of the actual safety margins than was indicated in NUREG-1738. The Sandia studies have consistently and conclusively shown that the safety margins are much larger than indicated by previous studies such as NUREG-1738.

1. Heat Transfer Mechanisms

Past NRC studies of spent fuel heatup and zirconium fire initiation conservatively did not consider certain natural heat-transfer mechanisms which would serve to limit heatup of the spent fuel assemblies and prevent a zirconium fire. In particular, these studies, including NUREG-1738, did not consider heat transfer from higher-decay-power assemblies to older, lower-decay-power fuel assemblies in the SFP. This heat transfer would substantially increase the effectiveness of air cooling in the event the SFP is drained, far beyond the effectiveness of air cooling cited in past studies. Both the Sandia studies and the NAS Report confirm the NRC conclusion that such heat transfer mechanisms allow rapid heat transfer away from the higher-powered assemblies. The NAS Report also noted that such heat transfer could air-cool the assemblies to prevent a zirconium fire within a relatively short time after the discharge of assemblies from the reactor to the SFP.⁷ Thus, air cooling is an effective, passive mechanism for cooling spent fuel assemblies in the pool.

2. Partial Drain-Down

Air cooling is less effective under the special, limited condition where the water level in the SFP drops to a point where water and steam cooling is not sufficient to prevent the fuel from overheating and initiating a zirconium fire, but the water level is high enough to block the full natural circulation of air flow through the assemblies. This condition has been commonly referred to as a partial draindown, and is cited in the Thompson Report. Under those

⁷ NAS Report at 53.

conditions, however, it is important to realistically model the heat transfer between high- and low-powered fuel assemblies. The heat transfer from hot fuel assemblies to cooler assemblies will delay the heat-up of assemblies, and allow plant operators time to take additional measures to restore effective cooling to the assemblies. Further, for very low-powered assemblies, the downward flow of air into the assemblies can also serve to cool the assembly even though the full-circulation flow path is blocked. Also, as discussed further in this document, all nuclear plant SFPs have been assessed to identify additional, existing cooling capability and to provide new supplemental cooling capability which could be used during such rare events. This supplemental cooling capability specifically addresses the cooling needs during partial draindown events, and would reduce the probability of a zirconium fire even during those extreme events.

3. License Amendments

In January 2006, the nuclear industry proposed a combination of internal and external strategies to enhance the spent fuel heat removal capability systems at every operating nuclear power plant. The internal strategy implements a diverse SFP makeup system that can supply the required amount of makeup water and SFP spray to remove decay heat. The external strategy involves using an independently-powered, portable, SFP coolant makeup and spray capability system that enhances spray and rapid coolant makeup to mitigate a wide range of possible scenarios that could reduce SFP water levels. In addition, in cases where SFP water levels can not be maintained, leakage control strategies would be considered along with guidance to maximize spray flows to the SFP. Time lines have been developed that include both dispersed and non-dispersed spent fuel storage. The NRC has approved license amendments and issued safety evaluations to incorporate these strategies into the plant licensing bases of all operating nuclear power plants in the United States.

C. Fuel Will Burn Regardless of Its Age

The NRC disagrees with the Petitioners' assertion that fuel will burn regardless of age. Older fuel (fuel which has been discharged from the reactor for a longer time) is more easily cooled and is less likely to ignite because of its lower decay power. A study relied upon by the Petitioners, NUREG-1738, did conservatively assume that spent fuel stored in an SFP, regardless of age, may

be potentially vulnerable to a partial drain down event, and that the possibility of a zirconium fire could not be ruled out on a generic basis. This conclusion, however, was in no sense a statement of certainty and was made in order to reach a conclusion on a generic basis, without relying on any plant-specific analyses.

Furthermore, the SFP zirconium fire frequency in NUREG-1738 was predicated on a bounding, conservative assumption that an SFP fire involving all of the spent fuel would occur if the water level in the SFP dropped below the top of the spent fuel. The NUREG-1738 analysis did not attempt to specifically address a number of issues and actions that would substantially reduce the likelihood of a zirconium fire, potentially rendering the frequency estimate to be remote and speculative. For example, NUREG-1738 did not account for the additional time available following the spent fuel being partially or completely uncovered, but prior to the onset of a zirconium fire, that would allow for plant operator actions, makeup of SFP water levels, and other mitigation measures. In addition, NUREG-1738 did not consider the impact of plant and procedure changes implemented as a result of the events of the September 11, 2001, terrorist attacks. NUREG-1738 did clarify that the likelihood of a zirconium fire under such conditions could be reduced by accident management measures, but it was not the purpose of NUREG-1738 to evaluate such accident management measures.

D. SFP Zirconium Fire Will Propagate

Although it is possible that once a spent fuel assembly ignites, the zirconium fire can propagate to other assemblies in the SFP, the NRC has determined (as explained previously) that the risk of an SFP zirconium fire initiation is very low.

E. SFP Zirconium Fire May Be Catastrophic

1. Not New and Significant Information; Very Low Probability

The Massachusetts AG states that "while such a catastrophic accident is unlikely, its probability falls within the range that NRC considers reasonably foreseeable." Thus, the Petitioners asserted that an SFP zirconium fire qualifies as a DBA and, that the impacts of an SFP fire must be discussed in the ER submitted by the licensee and the NRC's EIS, as well as designed against under NRC safety regulations.

The facts that a SFP contains a potentially large inventory of

radionuclides and that a release of that material could have adverse effects are not new. These facts are well known, and were considered in the risk evaluation of spent fuel storage contained in NUREG-1738. Even with the numerous conservatisms in the NUREG-1738 study, as described previously, the NRC was able to conclude that the risk from spent fuel storage is low, and is substantially lower than reactor risk.

A study relied upon by the Petitioners, the Thompson Report, claimed that the probability (frequency) of an SFP zirconium fire would be $2E-5$ per year⁸ for events excluding acts of malice (e.g., terrorism) and $1E-4$ per year⁹ for acts of malice. With respect to random events (i.e., excluding acts of malice), the NRC concludes that the Thompson Report estimate is overly conservative. A more complete and mechanistic assessment of the event, as described in section VI.E.2. of this Notice, and associated mitigation measures, leads to considerably lower values. With respect to events initiated by a terrorist attack, the NRC concludes that such probability (frequency) estimates are entirely speculative. The NRC also concludes that the additional mitigation measures for SFP events implemented since September 11, 2001, together with the more realistic assessment of spent fuel cooling, indicates that the likelihood of a zirconium fire, though numerically indeterminable, is very low.

The $2E-5$ per year estimate for events excluding acts of malice is based on an unsubstantiated assumption that 50 percent of all severe reactor accidents that result in an early release of substantial amounts of radioactive material will also lead to a consequential SFP zirconium fire. The Thompson Report does not identify the necessary sequence of events by which such scenarios might lead to SFP zirconium fires, or discuss the probability of their occurrence. The NRC analysis in the Shearon Harris ASLBP proceeding (described in section VI.E.2. of this Notice) showed that a more complete and mechanistic assessment of the event and associated mitigation measures leads to considerably lower values. This assessment includes the following:

- Frequency and characteristics of the releases from the containment for each release location;
- Transport of gases and fission products within the reactor building;

⁸ Two occurrences in 100,000 reactor years.

⁹ One occurrence in 10,000 reactor years.

- Resulting thermal and radiation environments in the reactor building, with emphasis on areas in which SFP cooling and makeup equipment is located, and areas in which operator access may be needed to implement response actions;
- Availability/survivability of SFP cooling and makeup equipment in the sequences of concern; and
- Ability and likelihood of successful operator actions to maintain or restore pool cooling or makeup (including consideration of security enhancements and other mitigation measures implemented in response to the terrorist attacks of September 11, 2001).

2. Shearon Harris Atomic Safety and Licensing Board Panel (ASLBP) Proceeding

In the proceeding regarding the expansion of the SFP at the Shearon Harris nuclear power plant, located near Raleigh, North Carolina, the Shearon Harris intervenor described a scenario similar to that raised by the Petitioners, namely, that a severe accident at the adjacent reactor would result in a SFP zirconium fire.¹⁰ The Shearon Harris proceeding considered the probability of a sequence of the following seven events:

- a. A degraded core accident.
- b. Containment failure or bypass.
- c. Loss of SFP cooling.
- d. Extreme radiation levels precluding personnel access.
- e. Inability to restart cooling or makeup systems due to extreme radiation doses.
- f. Loss of most or all pool water through evaporation.
- g. Initiation of a zirconium fire in the SFP.

Based on a detailed probabilistic risk assessment, the licensee calculated the probability of a severe reactor accident that causes an SFP zirconium fire to be $2.78E-8$ per year. The NRC staff calculated the probability to be $2.0E-7$ per year. The intervenor calculated the probability to be $1.6E-5$ per year. The ASLBP concluded that the probability of the postulated sequence of events resulting in an SFP zirconium fire was "conservatively in the range described by the Staff: $2.0E-7$ per year (two occurrences in 10 million reactor years) or less."¹¹ Accordingly, the ASLBP found that the occurrence of a severe reactor accident causing an SFP zirconium fire "falls within the category of remote and speculative matters."¹²

The Commission affirmed the ASLBP's decision, and the United States Court of Appeals, District of Columbia Circuit, upheld the Commission decision.¹³

In the Shearon Harris proceeding, the intervenor assumed that, given an early containment failure or bypass, a spent fuel zirconium fire would occur (i.e., a conditional probability of 1.0). In order for a reactor accident to lead to a SFP zirconium fire a number of additional conditions must occur. The reactor accident and containment failure must somehow lead to a loss of SFP cooling and must lead to a condition where extreme radiation levels preclude personnel access to take corrective action. There must be then an inability to restart cooling or makeup systems. There must be a loss of significant pool water inventory through evaporation (which can take substantial time). Finally, the event must also lead to a zirconium fire. In contrast to the intervenor's estimate, the licensee and the NRC staff estimated a conditional probability of about one percent that a severe reactor accident with containment failure would lead to a SFP accident. The NRC staff expects that the conditional probability of a SFP zirconium fire, given a severe reactor accident, would be similar to that established in the Shearon Harris proceeding. As such, 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.

The $1E-4$ per year estimate in the Thompson Report for events involving acts of malice assumes that there would be one attack on the population of U.S. nuclear power plants per century, and that this attack will be 100 percent successful in producing a SFP zirconium fire (thus, fire frequency = 0.01 attack/year \times 1.0 fire/attack \times $1/104$ total reactors = $1E-4$ /year). The security-related measures and other mitigation measures implemented since September 11, 2001, however, have significantly reduced the likelihood of a successful terrorist attack on a nuclear power plant and its associated SFP. Such measures include actions that would improve the likelihood of the following:

- a. Identifying/thwarting the attack before it is initiated.
- b. Mitigating the attack before it results in damage to the plant.

c. Mitigating the impact of the plant damage such that an SFP zirconium fire is avoided.

Given the implementation of additional security enhancements and mitigation strategies, as well as further consideration of the factors identified above, the NRC staff concludes that the frequency of SFP zirconium fires due to acts of malice is substantially lower than assumed by the Petitioners.

3. SFP Zirconium Fire Does Not Qualify As a DBA

Regarding the Petitioners' assertion that a SFP zirconium fire qualifies as a design-basis accident (DBA), the NRC staff has concluded that a realistic probability estimate would be very low, such that these events need not be considered as DBAs or discussed in ERs and EISs. Moreover, the set of accidents that must be addressed as part of the design basis has historically evolved from deterministic rather than probabilistic considerations. These considerations, which include defense-in-depth, redundancy, and diversity, are characterized by the use of the single-failure criterion.¹⁴ The single-failure criterion, as a key design and analysis tool, has the direct objective of promoting reliability through the enforced provision of redundancy in those systems which must perform a safety-related function. The single failure criterion is codified in Appendix A and Appendix K to 10 CFR Part 50 and other portions of the regulations. The SFP and related systems have been designed and approved in accordance with this deterministic approach.

F. Intentional Attack on a SFP is "Reasonably Foreseeable."

The Petitioners asserted that an intentional attack targeting a plant's SFP is "reasonably foreseeable." Specifically, the Petitioners raised both the NAS study and the decision by the United States Court of Appeals for the Ninth Circuit, *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), cert. denied 127 S. Ct. 1124 (2007), to support the assertion that the NRC's NEPA analysis of a license renewal action for a given facility must include analysis of the environmental impacts associated with a terrorist attack on that facility. The NRC has

¹⁴ "A single failure means an occurrence which results in the loss of capability of a component to perform its intended safety functions * * * Fluid and electric systems are considered to be designed against an assumed single failure if neither (1) a single failure of any active component * * * nor (2) a single failure of a passive component * * * results in a loss of the capability of the system to perform its safety functions." 10 CFR Part 50, App. A.

¹⁰ *Carolina Power Light Co.*, LBP-01-9, 53 NRC 239, 244-245 (2001).

¹¹ *Id.*, 53 NRC at 267.

¹² *Id.*, 53 NRC at 268.

¹³ *Carolina Power Light Co.*, Commission Law Issuance (CLI)-01-11, 53 NRC 370 (2001), pet. for review denied, sub nom. *Orange County, NC v. NRC*, 47 Fed. Appx. 1, 2002 WL 31098379 (D.C. Cir. 2002).

considered both the NAS Report and the Ninth Circuit decision, and remains of the view that an analysis of the environmental impacts of a hypothetical terrorist attack on an NRC-licensed facility is not required under NEPA.¹⁵ But, if an analysis of a hypothetical terrorist attack were required under NEPA, the NRC has determined that the environmental impacts of such a terrorist attack would not be significant, because the probability of a successful terrorist attack (i.e., one that causes an SFP zirconium fire, which results in the release of a large amount of radioactive material into the environment) is very low and therefore, within the category of remote and speculative matters.

1. NAS Report

The Petitioners rely, in part, upon the NAS Report, the public version of which was published in 2006 and is available from NAS.¹⁶ In response to a direction in the Conference Committee's Report accompanying the NRC's FY 2004 appropriation,¹⁷ the NRC contracted with NAS for a study on the safety and security of commercial spent nuclear fuel. The NAS made a number of findings and recommendations, including:

- SFPs are necessary at all operating nuclear power plants to store recently discharged fuel;
- Successful terrorist attacks on SFPs, though difficult, are possible;
- The probability of terrorist attacks on spent fuel storage cannot be assessed quantitatively or comparatively;
- If a successful terrorist attack leads to a propagating zirconium cladding fire, it could result in the release of large amounts of radioactive material; and
- Dry cask storage has inherent security advantages over spent fuel

¹⁵ In the wake of the Ninth Circuit's *Mothers for Peace* decision, the Commission decided against applying that holding to all licensing proceedings nationwide. See, e.g., *Amergen Energy Co. LLC* (Oyster Creek Nuclear Generating Station), CLI-07-8, 65 NRC 124, 128-29 (2007), *pet. for judicial review pending*, No. 07-2271 (3d Cir.). The Commission will, of course, adhere to the Ninth Circuit decision when considering licensing actions for facilities subject to the jurisdiction of that Circuit. See *id.* Thus, on remand in the *Mothers for Peace* case itself, the Commission is currently adjudicating intervenors' claim that the NRC Staff has not adequately assessed the environmental consequences of a terrorist attack on the Diablo Canyon Power Plant's proposed facility for storing spent nuclear fuel in dry casks. See, *Pacific Gas & Elec. Co.*, CLI-07-11, 65 NRC 148 (2007). The Commission's ultimate decision in that case will rest on the record developed in the adjudication.

¹⁶ The NRC response to the NAS Report is available at ADAMS Accession No. ML0502804280.

¹⁷ Conference Committee's Report (H. Rept. 108-357) accompanying the *Energy and Water Development Act, 2004* (Pub. L. 108-137, December 3, 2003).

storage, but it can only be used to store older spent fuel.

The NAS Report found, and the NRC agrees, that pool storage is required at all operating commercial nuclear power plants to cool newly discharged spent fuel. Freshly discharged spent fuel generates too much decay heat to be placed in a dry storage cask.

The NRC agrees with the NAS finding that the probability of terrorist attacks on spent fuel storage cannot be assessed quantitatively or comparatively. However, the NRC concludes that the additional mitigation measures for SFP events implemented since September 11, 2001, together with a more realistic assessment of spent fuel cooling, as shown by the Sandia studies, indicates that the likelihood of a zirconium fire, though numerically indeterminate, is very low.

Furthermore, the NAS Report states that "[i]t is important to recognize, however, that an attack that damages a power plant or its spent fuel storage facilities would not necessarily result in the release of any radioactivity to the environment. There are potential steps that can be taken to lower the potential consequences of such attacks."¹⁸ The NAS Report observed that a number of security improvements at nuclear power plants have been instituted since September 11, 2001, although the NAS did not evaluate the effectiveness and adequacy of these improvements and has called for an independent review of such measures. Nevertheless, the NAS Report states that "the facilities used to store spent fuel at nuclear power plants are very robust. Thus, only attacks that involve the application of large energy impulses or that allow terrorists to gain interior access have any chance of releasing substantial quantities of radioactive material."¹⁹

As discussed previously, following the terrorist attacks of September 11, 2001, the NRC has required that nuclear power plant licensees implement additional security measures and enhancements the Commission believes have made the likelihood of a successful terrorist attack on an SFP remote.

2. Ninth Circuit Decision

The Petitioners asserted that the NRC should follow the decision of the United States Court of Appeals for the Ninth Circuit, *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), *cert. denied* 127 S. Ct. 1124 (2007), by considering the environmental impacts of intentional attacks on nuclear power plant fuel

¹⁸ NAS Report at 6 (emphasis in the original).

¹⁹ NAS Report at 30.

storage pools in all licensing decisions. The Ninth Circuit held that the NRC could not, under NEPA, categorically refuse to consider the consequences of a terrorist attack against a spent fuel storage facility on the Diablo Canyon reactor site.

The NRC's longstanding view is that NEPA does not require the NRC to consider the environmental consequences of hypothetical terrorist attacks on NRC-licensed facilities. NEPA requires that there be a "reasonably close causal relationship" between the federal agency action and the environmental consequences.²⁰ The NRC renewal of a nuclear power plant license would not cause a terrorist attack; a terrorist attack would be caused by the terrorists themselves. Thus, the renewal of a nuclear power plant license would not be the "proximate cause" of a terrorist attack on the facility.

If NEPA required the NRC to consider the impacts of a terrorist attack, however, the NRC findings would remain unchanged. As previously described, the NRC has required, and nuclear power plant licensees have implemented, various security and mitigation measures that, along with the robust nature of SFPs, make the probability of a successful terrorist attack (i.e., one that causes an SFP zirconium fire, which results in the release of a large amount of radioactive material into the environment) very low. As such, a successful terrorist attack is within the category of remote and speculative matters for NEPA considerations; it is not "reasonably foreseeable." Thus, on this basis, the NRC finds that the environmental impacts of renewing a nuclear power plant license, in regard to a terrorist attack on an SFP, are not significant.

The NRC has 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.

G. SFP Zirconium Fire Should Be Considered Within the Analysis of SAMAs

The Petitioners asserted that SFP fires should be considered within the analysis of severe accident mitigation alternatives (SAMAs). While a large radiological release is still possible, and

²⁰ *Department of Transportation v. Public Citizen*, 541 U.S. 752, 767 (2004) citing *Metropolitan Edison v. People Against Nuclear Energy*, 460 U.S. 766, 774 (1983).

was assessed as part of Generic Issue 82, *Beyond Design Basis Accidents in Spent Fuel Pools*, and later, in NUREG-1738, the NRC considers the likelihood of such an event to be lower than that estimated in Generic Issue 82 and NUREG-1738. Based on the Sandia studies, and on the implementation of additional strategies implemented following September 11, 2001, the probability of a SFP zirconium fire is expected to be less than that reported in NUREG-1738 and previous studies. Thus, the very low probability of an SFP zirconium fire would result in an SFP risk level less than that for a reactor accident.

For example, in NUREG-1738, the SFP fire frequencies were conservatively estimated to be in the range of $5.8E-7$ per year to $2.4E-6$ per year. NUREG-1738 conservatively assumed that if the water level in the SFP dropped below the top of the spent fuel, an SFP zirconium fire involving all of the spent fuel would occur, and thereby bounded those conditions associated with air cooling of the fuel (including partial-drain down scenarios) and zirconium fire propagation. It did not mechanistically analyze the time between the spent fuel assemblies becoming partially or completely uncovered and the onset of a SFP zirconium fire, and the potential to recover SFP cooling and to restore the SFP water level within this time. NUREG-1738 also did not consider the possibility that air-cooling of the spent fuel alone could be sufficient to prevent SFP zirconium fires.

Furthermore, the Sandia studies indicated that air cooling would be much more effective in cooling the spent fuel assemblies. In those cases where air cooling is not effective, the time before fuel heatup and radiological release would be substantially delayed, thus providing a substantial opportunity for successful event mitigation. The Sandia studies, which more fully account for relevant heat transfer and fluid flow mechanisms, also indicated that air-cooling of spent fuel would be sufficient to prevent SFP zirconium fires much earlier following fuel offload than previously considered (e.g., in NUREG-1738), thereby further reducing the likelihood of an SFP zirconium fire. Additional mitigation strategies implemented subsequent to September 11, 2001, will serve to further enhance spent fuel coolability, and the potential to recover SFP cooling or to restore the SFP water level prior to the initiation of an SFP zirconium fire.

Given that the SFP risk level is less than that for a reactor accident, a SAMA that addresses SFP accidents would not

be expected to have a significant impact on total risk for the site. Despite the low level of risk from fuel stored in SFPs, additional SFP mitigative measures have been implemented by licensees since September 11, 2001. These mitigative measures further reduce the risk from SFP zirconium fires, and make it even more unlikely that additional SFP safety enhancements could substantially reduce risk or be cost-beneficial.

VII. Denial of Petitions

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.

Commissioner Gregory B. Jaczko's Dissenting View on the Commission's Decision To Deny Two Petitions for Rulemaking Concerning the Environmental Impacts of High-Density Storage of Spent Nuclear Fuel in Spent Fuel Pools

I disagree with the decision to deny the petition for rulemaking as included in this *Federal Register* notice. In general, I approve of the decision not to initiate a new rulemaking to resolve the petitioners' concerns, but because information in support of the petition will be considered when the staff undertakes the rulemaking to update the Generic Environmental Impact Statement for license renewal, I believe that the decision should have been to partially grant the petition rather than deny it.

The petitioners requested the agency review additional studies regarding spent fuel pool storage they believe would change the agency's current generic determination that the impacts of high-density pool storage are "small". I believe that the agency could commit to reviewing the information provided by the petitioners, along with any other new information, when the agency updates the Generic Environmental Impact Statement (GEIS) for License Renewal in the near future. Regardless of whether or not the information will change the GEIS' conclusions, at a minimum, the agency should be committing to ensure that this information is part of the analysis

performed by the staff upon the next update of the GEIS. While we can not predict the outcome of the significance level that will ultimately be assigned to the spent fuel category in the GEIS, it seems an obvious commitment to ensure that the ultimate designation will be appropriately based upon all information available to the staff at the time. Thus, I believe this decision should be explained as a partial granting of the petition. It may not provide the petitioners with everything they want, but it would more clearly state the obvious—that this information, and any other new information, will be reviewed by the agency and appropriately considered when the staff begins its update of the license renewal GEIS.

This specific issue illustrates a larger concern about how the agency handles petitions for rulemaking in general. I find it unfortunate that the agency appears to limit its responses to petitions based upon the vocabulary that has been established surrounding this program. Currently, when the agency discusses these petitions, we discuss them in the context of "granting" or "denying" the rulemaking petitions. We then appear to be less inclined to "grant" unless we are committing to the precise actions requested in the petition. But these petitions are, by their very definition, requests for rulemakings; which means, even if we do "grant" a petition for rulemaking, we can not guarantee a particular outcome for the final rule. The final rulemaking is the result of staff's technical work regarding the rule, public comments on the rule, and resolution of those comments. Rulemaking petitions are opportunities for our stakeholders to provide us with new ideas and approaches for how we regulate. By limiting our responses, we limit our review of the request, and thus, we risk missing many potential opportunities to improve the way we regulate.

Additional Views of the Commission

The Commission does not share Commissioner Jaczko's dissenting view. We appreciate his statement of concern about the petition for rulemaking (PRM) process, but believe these matters are extraneous to the Commission's analyses of the petitioners' technical bases for this particular rulemaking request and, consequently, they had no bearing on the majority view. Specifically, the Commission does not agree that the petitions should be granted in part on the basis of the agency's plan to update the Generic Environmental Impact Statement (GEIS) for License Renewal and make attendant

rule changes in the future. The Commission's detailed statement of reasons for denial of the petitions is the product of a careful review of the petitioners' assertions and other associated public comments, and is supported by the facts before us. In these circumstances, the Commission does not believe the petitioners' request can fairly, or reasonably, be "granted" in part based on a future undertaking which itself had no genesis in the petitioners' requests.

The Commission's timely and decisive action in response to the two petitions serves the interests of the Commission and other participants in an effective, disciplined, and efficient rulemaking petition process. In this instance, a decision now has particular value since it directly addresses the petitioners' statements of significant concern about certain, generic aspects of ongoing and future license renewal reviews. While the analyses performed to respond to these petitions will also undoubtedly inform NRC staff proposals regarding the next update of the GEIS, the Commission does not yet have such proposals before it. Any final Commission decisions on an updated GEIS would be preceded by proposed changes, solicitation of public comment, and evaluation of all pertinent information and public comments. Furthermore, a partial "granting" of the petition could imply that the Commission endorses the petitioners' requests and will give them greater weight than other points of view during the GEIS rulemaking.

As to the other matter raised in Commissioner Jaczko's dissent—that of agency review and disposition of petitions for rulemaking more generally—while petitions for rulemaking are indeed opportunities for stakeholders to suggest new considerations and approaches for regulation, Commissioner Jaczko's general concerns about the agency's process for handling rulemaking petitions go beyond the subject of the Commission's action on these petitions. However, this subject matter is being considered, as the Commission has instructed NRC staff [SRM dated August 6, 2007] to conduct a review of the agency's PRM process. At such time as staff may recommend, as an outgrowth of this review, specific proposals for Commission action which would strengthen the agency PRM process, the Commission will assess such recommendations and act on them, as appropriate.

Dated at Rockville, Maryland, this 1st day of August 2008.

For the Nuclear Regulatory Commission.
Annette L. Vietti-Cook,
Secretary of the Commission.
[FR Doc. E8-18291 Filed 8-7-08; 8:45 am]
BILLING CODE 7590-01-P

DEPARTMENT OF THE INTERIOR

Office of Surface Mining Reclamation and Enforcement

30 CFR Part 901

[SATS No. AL-074-FOR; Docket No. OSM-2008-0015]

Alabama Regulatory Program

AGENCY: Office of Surface Mining Reclamation and Enforcement, Interior.
ACTION: Proposed rule; public comment period and opportunity for public hearing on proposed amendment.

SUMMARY: We, the Office of Surface Mining Reclamation and Enforcement (OSM), are announcing receipt of a proposed amendment to the Alabama regulatory program (Alabama program) under the Surface Mining Control and Reclamation Act of 1977 (SMCRA or the Act). Alabama proposes revisions to its regulations regarding permit fees and civil penalties. Alabama intends to revise its program to improve operational efficiency.

This document gives the times and locations that the Alabama program and proposed amendment to that program are available for your inspection, the comment period during which you may submit written comments on the amendment, and the procedures that we will follow for the public hearing, if one is requested.

DATES: Comments on the proposed rule must be received on or before 4 p.m., c.t., September 8, 2008, to ensure our consideration. If requested, we will hold a public hearing on the amendment on September 2, 2008. We will accept requests to speak at a hearing until 4 p.m., c.t. on August 25, 2008.

ADDRESSES: You may submit comments by either of the following two methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. The proposed rule is listed under the agency name "OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT" and has been assigned Docket ID: OSM-2008-0015. If you would like to submit comments through the Federal eRulemaking Portal, go to www.regulations.gov and do the following. Click on the "Advanced Docket Search" button on the right side of the screen. Type in the Docket ID

OSM-2008-0015 and click the submit button at the bottom of the page. The next screen will display the Docket Search Results for the rulemaking. If you click on OSM-2008-0015, you can view the proposed rule and submit a comment. You can also view supporting material and any comments submitted by others.

- *Mail/Hand Delivery/Courier:* Sherry Wilson, Director, Birmingham Field Office, Office of Surface Mining Reclamation and Enforcement, 135 Gemini Circle, Suite 215, Homewood, Alabama 35209. Please include the Docket ID (OSM-2008-0015) with your comments.

We cannot ensure that comments received after the close of the comment period (see **DATES**) or sent to an address other than the two listed above will be included in the docket for this rulemaking and considered.

For additional information on the rulemaking process and the public availability of comments, see "III. Public Comment Procedures" in the **SUPPLEMENTARY INFORMATION** section of this document.

You may receive one free copy of the amendment by contacting OSM's Birmingham Field Office. See below **FOR FURTHER INFORMATION CONTACT**.

You may review a copy of the amendment during regular business hours at the following locations:

Sherry Wilson, Director, Birmingham Field Office, Office of Surface Mining Reclamation and Enforcement, 135 Gemini Circle, Suite 215, Homewood, Alabama 35209, Telephone: (205) 290-7282, swilson@osmre.gov.

Randall C. Johnson, Director, Alabama Surface Mining Commission, 1811 Second Avenue, P.O. Box 2390, Jasper, Alabama 35502-2390, Telephone: (205) 221-4130.

FOR FURTHER INFORMATION CONTACT: Sherry Wilson, Director, Birmingham Field Office. Telephone: (205) 290-7282. E-mail: swilson@osmre.gov.

SUPPLEMENTARY INFORMATION:

- I. Background on the Alabama Program
- II. Description of the Proposed Amendment
- III. Public Comment Procedures
- IV. Procedural Determinations

I. Background on the Alabama Program

Section 503(a) of the Act permits a State to assume primacy for the regulation of surface coal mining and reclamation operations on non-Federal and non-Indian lands within its borders by demonstrating that its program includes, among other things, " * * * a State law which provides for the regulation of surface coal mining and reclamation operations in accordance

United States Court of Appeals For the First Circuit

NOTICE OF APPEARANCE

No.

Short Title: Commonwealth of Massachusetts v. NRC

The Clerk will enter my appearance as counsel on behalf of *(please list names of all parties represented, using additional sheet(s) if necessary)*:

Commonwealth of Massachusetts as the

appellant(s)

appellee(s)

amicus curiae

petitioner(s)

respondent(s)

intervenor(s)

The party I represented below is not a party to the appeal and I wish to be removed from the service list. Please list the names of all parties represented:



Signature

9/29/08

Date

Matthew Brock, Assistant Attorney General
Name

Office of the Attorney General, Commonwealth of Mass.
Firm Name (if applicable)

617 963-2425

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617 727-9665

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Email

Court of Appeals Bar Number: 13742

Has this case or any related case previously been on appeal?

No

Yes

Court of Appeals No. 07-1482 and 07-1483 (First Circuit); 08-3903-AG, State of NY v. US NRC & the United States (Second Circuit)

Attorneys for both appellant and appellee must file a notice of appearance within 14 days of case opening. New or additional counsel may enter an appearance outside the 14 day period; however, a notice of appearance may not be filed after the appellee/respondent brief has been filed without leave of court. 1st Cir. R. 12.0(a).

Counsel must complete and return this notice of appearance in order to file pleadings in this court. Counsel not yet admitted to practice before this court must submit an application for admission with the form. 1st Cir. R. 46.0(a)(2).

CERTIFICATE OF SERVICE

I, Matthew Brock, hereby certify that on September 29, 2008, copies of the foregoing Massachusetts Attorney General's Petition for Review of the U.S. Nuclear Regulatory Commission's Denial of Petitions for Rulemaking [PRM-51-10 and PRM-51-12] were served on the following counsel and other representatives of certain parties or participants to the rulemaking proceeding and the related license renewal hearings for the Pilgrim and Vermont Yankee Nuclear Power Stations, by first-class mail:

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*Parties marked with an asterisk are to be served by the Court, pursuant to FRAP 15(c), as respondents to the Petition for Review.

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Matthew Brock
Assistant Attorney General
Commonwealth of Massachusetts

United States Court of Appeals

FOR THE FIRST CIRCUIT

APPEARANCE FORM

(Please type or print all answers)

No. _____

v. _____

COUNSEL MUST COMPLETE & RETURN THIS APPEARANCE FORM IN ORDER TO FILE PLEADINGS IN THIS COURT.

Please review and complete the case caption form. If you represent a litigant who was a party below, *but who is not a party on appeal*, do not designate yourself as counsel for the appellant or the appellee.

The Clerk will enter my appearance as Counsel for the _____ appellant _____ appellee.

I do not represent a party to the appeal _____.

(Name of person or entity represented)

Name of Counsel: _____

Name of Firm: _____

Firm Address: _____

Tel.: _____

Fax: _____

Signature _____

Court of Appeals Bar Number: _____

Date: _____

Has this case or any related case previously been on appeal?

Yes _____

No _____

Court of Appeals No. _____

Appearances should be signed by a member of this Court. If you have not been admitted, you may file an appearance subject to subsequent admission to practice in this Court.

SEPARATE FORMS MUST BE COMPLETED FOR EACH PERSON OR ENTITY REPRESENTED.

UNITED STATES COURT OF APPEALS
FOR THE FIRST CIRCUIT
(617) 748-9057
DOCKETING STATEMENT

INSTRUCTIONS

1. Counsel for an appellant must file the docketing statement with all attachments for every case appealed or cross appealed to the Court of Appeals. The docketing statement must be received by the Court of Appeals clerk's office within the fourteen days allowed to be deemed timely filed. Copies must be served on all parties to the action below and, in civil cases, on First Circuit Settlement Counsel.
2. The attorney filing the notice of appeal is responsible for filing the docketing statement, even if different counsel will handle the appeal. In the case of multiple appellants represented by separate counsel, the parties must confer and decide who will file the docketing statement. Appellants proceeding pro se may file a docketing statement, but are not required to do so.
3. The docketing statement is also used by First Circuit Settlement Counsel to facilitate pre-briefing review of civil cases in which all parties are represented by counsel, and in mediation conducted in such cases under 1st Cir. R. 33.0. If counsel in a civil case believes a mediation conference would be beneficial, counsel may make a confidential request for mediation by contacting the Office of the Settlement Counsel directly at (617)748-9624.
4. Counsel's failure to file the docketing statement within the time set forth will cause the Court to initiate the process for dismissal of the appeal under 1st Cir. R. 3.0.
5. IF AN OPPOSING PARTY CONCLUDES THAT THE DOCKETING STATEMENT IS IN ANY WAY INACCURATE, INCOMPLETE, OR MISLEADING, THE CLERK'S OFFICE MUST BE INFORMED IN WRITING OF ANY ERRORS AND ANY PROPOSED ADDITIONS OR CORRECTIONS WITHIN SEVEN DAYS OF SERVICE OF THE DOCKETING STATEMENT, WITH COPIES TO ALL OTHER PARTIES.
6. You must attach to this docketing statement:
 - ADDITIONAL PAGES CONTAINING EXTENDED ANSWERS TO QUESTIONS ON THIS FORM.
 - APPEARANCE FORMS FOR COUNSEL FOR EACH APPELLANT.
 - A COPY OF THE TRANSCRIPT ORDER (see Docketing Statement, Question E).
 - A CERTIFICATE OF SERVICE OF THIS DOCKETING STATEMENT ON ALL PARTIES TO THE ACTION BELOW AND, IN COUNSELED CIVIL CASES, ON FIRST CIRCUIT SETTLEMENT COUNSEL.

UNITED STATES COURT OF APPEALS
FOR THE FIRST CIRCUIT
(617) 748-9057
DOCKETING STATEMENT

Proposed Caption of Case:
No.

Plaintiff - Appellant
v.
Defendant - Appellee

Type of Action

Civil
 Criminal/Prisoner
 Cross Appeal

A. Timeliness of Appeal

1. Date of entry of judgment or order appealed from _____

2. Date this notice of appeal filed _____

If cross appeal, date first notice of appeal filed

3. Filing date of any post-judgment motion filed by any
party which tolls time under Fed.R.App.P. 4(a)(4) and
4(b) _____

4. Date of entry of order deciding above post-judgment
motion _____

5. Filing date of any motion to extend time under
Fed.R.App.P. 4(a)(5), 4(a)(6) or 4(b) _____
Time extended to _____

B. Finality of Order of Judgment

1. Is the order or judgment appealed from a final decision
on the merits? Yes No

2. If no, is the order appealed from a collateral or
interlocutory order reviewable under any exception to
the finality rule? Yes No

If yes, explain

3. Did the district court order entry of judgment as to fewer than all claims or all parties pursuant to Fed.R.C.P. 54(b)? Yes No

If yes, explain

- C. Has this case previously been appealed? Yes No

If yes, give the case name, docket number and disposition of each prior appeal.

- D. Are any related cases or cases raising related issues pending in this Court, any district court of this circuit, or the Supreme Court? Yes No

If yes, cite the case and the manner in which it is related on a separate page. If abeyance or consolidation is warranted, counsel must file a separate motion seeking such relief.

- E. Were there any in-court proceedings below? Yes No

Is a transcript necessary for this appeal? Yes No

If yes, is transcript already on file with district court? Yes No

If transcript is not already on file, attach copy of transcript order.

- F. List each adverse party to the appeal. If no attorney, give address and telephone number of the adverse party. Attach additional page if necessary.

1. Adverse party _____

Attorney _____

Address _____

Telephone _____

2. Adverse party _____

Attorney _____

Address _____

Telephone _____

3. Adverse party _____

Attorney _____

Address _____

Telephone _____

G. List name(s) and address(es) of appellant(s) who filed this notice of appeal and appellant's counsel. Attach additional page if necessary.

1. Appellant(s) name _____

Address _____

Telephone _____

Attorney's name _____

Firm _____

Address _____

Telephone _____

2. Appellant(s) name _____

Address _____

Telephone _____

Attorney's name _____

Firm _____

Address _____

Telephone _____

Will you be handling the appeal? (In criminal cases counsel below will handle the appeal unless relieved by this court.)

Yes No

Fed.R.App.P. 12(b) provides that each attorney who files a notice of appeal must file with the clerk of the Court of Appeals a statement naming each party represented on appeal by that attorney. 1st Cir. R. 12.0 requires that statement in the form of an appearance. Any counsel who filed a notice of appeal must provide the requisite appearance to be attached to this form.

Attorneys who are associated with the case, but not actively representing a party on appeal, should NOT file an appearance form.

A copy of this Docketing Statement must be served on all other parties to the appeal, and in civil cases, Settlement Counsel, Civil Appeals Management Program, 1 Courthouse Way, Suite 3440, Boston, MA 02210, must be served as well.

UNITED STATES COURT OF APPEALS FOR THE FIRST CIRCUIT
NOTICE OF ELECTRONIC AVAILABILITY OF CASE INFORMATION

This Court's docket and opinions are available in electronic form, via WebPACER, on the Court's internet site at www.ca1.uscourts.gov. Although party filings are not typically posted on the Court's internet site, briefs filed with the Court are copied and posted to internet sites maintained by other organizations. Therefore, parties should not include in their public filings information that is too private or sensitive to include in an opinion or docket on the Court's internet site or in a brief posted on the internet.

Specifically, it is the policy of the U.S. Judicial Conference that parties not include, or partially redact where inclusion is necessary, the following personal data identifiers from documents being prepared for initial filing, particularly where those identifiers may be made available in electronic form:

- **Social Security Numbers.** If an individual's social security number must be included only the last four digits of that number should be used.
- **Names of Minor Children.** If the involvement of a minor child must be mentioned, only the initials of that child should be used.
- **Dates of Birth.** If an individual's date of birth must be included, only the year should be used.
- **Financial Account Numbers.** If financial account numbers are relevant, only the last four digits of these numbers should be used.
- **Home Addresses in Criminal Cases.** If a home address must be included, only the city and state should be listed.

If the caption of the case contains any of the personal data identifiers listed above, the parties should file a motion to amend caption to redact the identifier.

Parties wishing to file documents containing the personal data identifiers listed above may file unredacted documents under seal, together with redacted versions for the public file. Alternatively, they may file a sealed reference list containing the complete personal data identifiers and the redacted identifiers used in their place, together with redacted versions of the documents for the public file.

Parties should exercise caution in including other sensitive personal data in their filings, such as personal identifying numbers, medical records, employment history, individual financial information, proprietary or trade secret information, information regarding an individual's cooperation with the government, information regarding the victim of any criminal activity, national security information, and sensitive security information as described in 49 U.S.C. § 114.

Attorneys are urged to share this notice with their clients so that an informed decision can be made about inclusion of sensitive information. The clerk will not review filings for redaction. For further information, see <http://www.privacy.uscourts.gov/>.



THE COMMONWEALTH OF MASSACHUSETTS
OFFICE OF THE ATTORNEY GENERAL

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MARTHA COAKLEY
ATTORNEY GENERAL

(617) 727-2200
www.mass.gov/ago

September 29, 2008

Richard Cushing Donovan, Clerk
United States Court of Appeals for the First Circuit
1 Courthouse Way, Suite 2500
Boston, MA 02110

Re: *Petition for Review of PRM 51-10, NRC-2006-0022 and PRM 51-12,
NRC-2007-0019
(U.S. Nuclear Regulatory Commission's Denial of Petitions for
Rulemaking)*

Dear Mr. Donovan:

Enclosed for filing please find:

1. An original and three copies of a Petition for Review, including a copy of the order issued by the U.S. Nuclear Regulatory Commission ("NRC") denying two petitions for rulemaking ("PRM"); PRM-51-10, by the Attorney General for the Commonwealth of Massachusetts, and PRM-51-12, by the Attorney General for the State of California;
2. Pursuant to F.R.A.P. 15(c) and 28 U.S.C. § 2344, two additional copies of the Petition for service by the Clerk's office on the NRC and the U.S. Attorney General.
3. Appearance form executed by counsel for the Commonwealth of Massachusetts;
4. The filing fee of \$450; payable to the Clerk, U.S. Court of Appeals.
5. Certificate of Service.

Pursuant to our call to your office, I understand that the Commonwealth does not need to file a Docketing Statement for this administrative appeal.



Richard Cushing Donovan, Clerk

September 29, 2008

Page 2

As attested in the attached Certificate of Service, copies of this Petition for Review and Notice of Appearance have been served on counsel for the following parties or interested persons who have participated in the related administrative proceedings below, including the license renewal hearings for the Vermont Yankee Nuclear Power Station and the Pilgrim Nuclear Power Station:

Atomic Safety and Licensing Board Panel for the Pilgrim Nuclear Power Station
Atomic Safety and Licensing Board Panel for the Vermont Yankee Power Station
Staff of the U.S. Nuclear Regulatory Commission
Entergy Nuclear Vermont Yankee, LLC, Entergy Nuclear Generation Company
and Entergy Nuclear Operations, Inc.
State of Vermont
State of New Hampshire
Town of Marlboro, Vermont
Town of Plymouth, Massachusetts
Town of Duxbury, Massachusetts
New England Coalition
Pilgrim Watch
The National Legal Scholars Law Firm
Attorneys General for the states of California, Connecticut, Illinois, Kentucky,
Louisiana, New Hampshire, New Jersey, New York and Vermont

Finally, I request that you stamp and return an additional copy of the Petition with the docket number for our files.

Thank you.

Sincerely,



Matthew Brock
Assistant Attorney General
Environmental Protection Division

cc: Service List

UNITED STATES COURT OF APPEALS
FOR THE FIRST CIRCUIT

COMMONWEALTH OF
MASSACHUSETTS,

Petitioner,

v.

UNITED STATES NUCLEAR REGULATORY
COMMISSION and the UNITED STATES
OF AMERICA,

Respondents

**PETITION FOR REVIEW OF U.S. NUCLEAR REGULATORY
COMMISSION DECISION TO DENY PETITIONS FOR
RULEMAKING PRM 51-10 and PRM 51-12**

Pursuant to F.R.A.P. 15 and 28 U.S.C. §§ 2342-2344, Petitioner, the Commonwealth of Massachusetts (“Commonwealth”), hereby petitions the Court for review of an order by the U.S. Nuclear Regulatory Commission (“NRC” or “Commission”). The NRC issued the order to deny a petition by the Commonwealth of Massachusetts for a rulemaking related to Entergy Nuclear Operations, Inc.’s and Entergy Nuclear Vermont Yankee LLC’s (collectively “Entergy’s”) applications for a 20-year extension of the licenses to operate the Pilgrim nuclear power plant in Plymouth, MA and the Vermont Yankee nuclear power plant in Vernon, Vermont. The State of

California filed a separate rulemaking petition that supported the Massachusetts rulemaking petition. In a single order, the NRC denied both petitions.

The Commonwealth seeks review of the following order:

- Nuclear Regulatory Commission Denial of Petitions for Rulemaking, Docket Nos. PRM-51-10 and PRM-51-12, 73 Federal Register 46,204 (August 8, 2008) (“Denial Decision”)(Attachment 1).

The Commonwealth contends that by denying the Commonwealth’s and California’s rulemaking petitions and refusing to address, either in a site specific environmental impact statement (“EIS”) as part of the relicensing process for the Pilgrim and Vermont Yankee nuclear power plants, or in a generic rulemaking EIS applicable to those plants, the environmental impacts of serious spent fuel pool accidents caused by a wide range of factors including terrorist attacks, natural phenomena, operator error, and equipment failure, the NRC violated the Atomic Energy Act, the National Environmental Policy Act, the Administrative Procedure Act, and NRC regulations for implementation of those statutes.

Therefore, the Commonwealth asks this Court to:

- (a) review and reverse the Denial Decision;

(b) order the NRC to prepare an EIS, with opportunity for public comment, applicable to the Pilgrim and Vermont Yankee nuclear power plants that addresses the environmental impacts of serious spent fuel pool accidents caused by a wide range of factors including terrorist attacks, natural phenomena, operator error, and equipment failure;

(c) declare that the NRC may not permit Entergy to continue to operate the Pilgrim and Vermont Yankee nuclear power plants past the expiration of their current licenses in 2012 unless and until the NRC fully complies with its statutory and regulatory obligations for the renewal of the licenses, including completion of the EIS; and

(d) grant such other relief as the Court may deem appropriate.

Respectfully submitted,

By its Attorneys,

MARTHA COAKLEY
ATTORNEY GENERAL



Matthew Brock, Assistant Attorney General
Environmental Protection Division
Office of the Attorney General
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September 27, 2008

Proposed Rules

Federal Register

Vol. 73, No. 154

Friday, August 8, 2008

This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rule making prior to the adoption of the final rules.

NUCLEAR REGULATORY COMMISSION

10 CFR Part 51

[Docket No. PRM-51-10, NRC-2006-0022 and Docket No. PRM-51-12, NRC-2007-0019]

The Attorney General of Commonwealth of Massachusetts, The Attorney General of California; Denial of Petitions for Rulemaking

AGENCY: Nuclear Regulatory Commission (NRC).

ACTION: Petition for rulemaking; denial.

SUMMARY: The NRC is denying two petitions for rulemaking (PRM), one filed by the Attorney General of the Commonwealth of Massachusetts (Massachusetts AG) and the other filed by the Attorney General for the State of California (California AG), presenting nearly identical issues and requests for rulemaking concerning the environmental impacts of the high-density storage of spent nuclear fuel in large water pools, known as spent fuel pools (SFPs). The Petitioners asserted that "new and significant information" shows that the NRC incorrectly characterized the environmental impacts of high-density spent fuel storage as "insignificant" in its National Environmental Policy Act (NEPA) generic environmental impact statement (EIS) for the renewal of nuclear power plant licenses. Specifically, the Petitioners asserted that spent fuel stored in high-density SFPs is more vulnerable to a zirconium fire than the NRC concluded in its NEPA analysis.

ADDRESSES: You can access publicly available documents related to these petitions for rulemaking using the following methods:

Federal e-Rulemaking Portal: Go to <http://www.regulations.gov> and search for documents filed under Docket ID [NRC-2006-0022] (PRM-51-10), and [NRC-2007-0019] (PRM-51-12).

NRC's Public Document Room (PDR): The public may examine and have copied for a fee publicly available

documents at the NRC's PDR, Public File Area O1 F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland.

NRC's Agencywide Documents Access and Management System (ADAMS): Publicly available documents created or received at the NRC are available electronically at the NRC's electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. From this page, the public can gain entry into ADAMS, which provides text and image files of NRC's public documents. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC PDR reference staff at 1-899-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov.

FOR FURTHER INFORMATION CONTACT: L. Mark Padovan, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-1423, e-mail Mark.Padovan@nrc.gov.

SUPPLEMENTARY INFORMATION:

- I. Background
- II. Petitioners' Requests
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- IV. NEPA and NUREG-1437
- V. Reasons for Denial—General
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 - B. Physical Security
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 2. Ninth Circuit Decision
 8. SFP Zirconium Fire Should be Considered within the Analysis of SAMAs
- VII. Denial of Petitions

I. Background

The NRC received two PRMs requesting that Title 10 of the Code of Federal Regulations (10 CFR), Part 51, be amended. The Massachusetts AG filed its petition on August 25, 2006 (docketed by the NRC as PRM-51-10). The NRC published a notice of receipt and request for public comment in the **Federal Register** on November 1, 2006 (71 FR 64169). The California AG filed its petition on March 16, 2007 (docketed by the NRC as PRM-51-12). PRM-51-12 incorporates by reference the facts and legal arguments set forth in PRM-51-10. The NRC published a notice of receipt and request for public comment on PRM-51-12 in the **Federal Register** on May 14, 2007 (72 FR 27068). The California AG filed an amended petition (treated by the NRC as a supplement to PRM 51-12) on September 19, 2007, to clarify its rulemaking request. The NRC published a notice of receipt for the supplemental petition in the **Federal Register** on November 14, 2007 (72 FR 64003). Because of the similarities of PRM-51-10 and PRM-51-12, the NRC evaluated the two petitions together.

The Petitioners asserted the following in their petitions:

1. "New and significant information" shows that the NRC incorrectly characterized the environmental impacts of high-density spent fuel storage as "insignificant" in the NRC's NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, May 1996. Specifically, the Petitioners asserted that an accident or a malicious act, such as a terrorist attack, could result in an SFP being drained, either partially or completely, of its cooling water. The Petitioners further asserted that this drainage would then cause the stored spent fuel assemblies to heat up and then ignite, with the resulting zirconium fire releasing a substantial amount of radioactive material into the environment.

2. The bases of the "new and significant information" are the following:

- a. NUREG-1738, *Technical Study of the Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants*, January 2001

- b. National Academy of Sciences Committee on the Safety and Security of Commercial Spent Nuclear Fuel Storage, *Safety and Security of Commercial*

Spent Nuclear Fuel Storage (National Academies Press: 2006) (NAS Report)

c. Gordon R. Thompson, "Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants," May 25, 2006 (Thompson Report)

3. Specifically, the Petitioners asserted that the "new and significant" information shows the following:

a. The fuel will burn if the water level in an SFP drops to the point where the tops of the fuel assemblies are uncovered (complete or partial water loss resulting from SFP drainage being caused by either an accident or terrorist attack).

b. The fuel will burn regardless of its age.

c. The zirconium fire will propagate to other assemblies in the pool.

d. The zirconium fire may be catastrophic.

e. A severe accident caused by an intentional attack on a nuclear power plant SFP is "reasonably foreseeable."

The Petitioners also asserted that new and significant information shows that the radiological risk of a zirconium fire in a high-density SFP at an operating nuclear power plant can be comparable to, or greater than, the risk of a core-degradation event of non-malicious origin (i.e., a "severe accident") at the plant's reactor. Consequently, the Petitioners asserted that SFP fires must be considered within the body of severe accident mitigation alternatives (SAMAs).

II. Petitioners' Requests

PRM-51-10 requested that the NRC take the following actions:

1. Consider new and significant information showing that the NRC's characterization of the environmental impacts of spent fuel storage as insignificant in NUREG-1437 is incorrect.

2. Revoke the regulations which codify that incorrect conclusion and excuse consideration of spent fuel storage impacts in NEPA decision-making documents, namely, 10 CFR 51.53(c)(2), 51.95(c) and Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants," of appendix B to subpart A of 10 CFR Part 51. Further, revoke 10 CFR 51.23(a) and (b), 51.30(b), 51.53, 51.61, and 51.80(b) to the extent that these regulations find, imply, or assume that environmental impacts of high-density pool storage are insignificant, and therefore need not be considered in any plant-specific NEPA analysis.

3. Issue a generic determination that the environmental impacts of high-

density pool storage of spent fuel are significant.

4. Require that any NRC licensing decision that approves high-density pool storage of spent fuel at a nuclear power plant, or any other facility, must be accompanied by a plant-specific EIS that addresses the environmental impacts of high-density pool storage of spent fuel at that nuclear plant and a reasonable array of alternatives for avoiding or mitigating those impacts.

5. Amend its regulations to require that SAMAs that must be discussed in utility company environmental reports (ERs) and NRC supplemental EISs for individual plants under 10 CFR 51.53(c)(3)(ii)(L) and Table B-1 of appendix B to subpart A of 10 CFR part 51 ("Postulated Accidents: Severe Accidents") must include alternatives to avoid, or mitigate, the impacts of high-density pool zirconium fires.

PRM-51-12 incorporates by reference PRM-51-10. PRM-51-12 requested that the NRC take the following actions:

1. Rescind all NRC regulations found in 10 CFR part 51 that imply, find, or determine that the potential environmental effects of high-density pool storage of spent nuclear fuel are not significant for purposes of NEPA and NEPA analysis.

2. Adopt, and issue, a generic determination that approval of such storage at a nuclear power plant, or any other facility, does constitute a major federal action that may have a significant effect on the human environment.

3. Require that no NRC licensing decision that approves high-density pool storage of spent nuclear fuel at a nuclear power plant, or other storage facility, may issue without the prior adoption and certification of an EIS that complies with NEPA in all respects, including full identification, analysis, and disclosure of the potential environmental effects of such storage, including the potential for accidental or deliberately caused release of radioactive products to the environment, whether by accident or through acts of terrorism, as well as full and adequate discussion of potential mitigation for such effects, and full discussion of an adequate array of alternatives to the proposed storage project.

III. Public Comments

The NRC's notice of receipt and request for public comment invited interested persons to submit comments. The comment period for PRM 51-10 originally closed on January 16, 2007, but was extended through March 19, 2007. The public comment period for

PRM 51-12 closed on July 30, 2007.

Accordingly, the NRC considered comments received on both petitions through the end of July 2007. The NRC received 1,676 public comments, with 1,602 of these being nearly identical form e-mail comments supporting the petitions. Sixty-nine other comments also support the petitions. These comments were submitted by States, private organizations, and members of the U.S. Congress. Two letters from the Nuclear Energy Institute (NEI) oppose the petitions, and three nuclear industry comments endorse NEI's comments.

In general, the comments supporting the petitions focused on the following main elements of the petitions:

- NRC should evaluate the environmental impacts (large radioactive releases and contamination of vast areas) of severe accidents and intentional attacks on high-density SFP storage in its licensing decisions (NEPA analysis).

- The 2006 decision of the United States Court of Appeals for the Ninth Circuit, *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), cert. denied 127 S. Ct. 1124 (2007), concluded that the NRC must evaluate the environmental impacts of a terrorist attack on SFP storage in its licensing decisions.

- NRC's claim that the likelihood of a SFP zirconium fire is remote is incorrect. Partial loss of water in an SFP could lead to a zirconium fire and release radioactivity to the environment.

- NRC's characterization of the environmental impacts of high-density SFP storage as "insignificant" in NUREG-1437 is incorrect, and the NRC should revoke the regulations which codify this.

- Any licensing decision approving high-density spent fuel storage should have an EIS.

Comments opposing the petitions centered on the following:

- Petitioners failed to show that regulatory relief is needed to address "new and significant" information concerning the potential for spent fuel zirconium fires in connection with high-density SFP storage. None of the documents that the Petitioners cited or referenced satisfy the NRC's standard for new and significant information.

- Petitioners failed to show that the Commission should rescind its Waste Confidence decision codified at 10 CFR 51.23, or change its determination that the environmental impacts of high-density spent fuel storage are insignificant.

- The Commission has recently affirmed its longstanding view that NEPA demands no terrorism inquiry,

and that the NRC therefore need not consider the environmental consequences of hypothetical terrorist attacks on NRC-licensed facilities.

• The Commission's rejection of the Ninth Circuit Court's view is consistent with the U.S. Supreme Court's position that NEPA should not be read to force agencies to consider environmental impacts for which they cannot reasonably be held responsible. Moreover, the NRC has, in fact, examined terrorism under NEPA and found the impacts similar to the impacts of already-analyzed, severe reactor accidents.

The NRC reviewed and considered the comments in its decision to deny both petitions, as discussed in the following sections:

IV. NEPA and NUREG-1437

The NRC's environmental protection regulations in 10 CFR Part 51 identify renewal of a nuclear power plant operating license as a major federal action significantly affecting the quality of the human environment. As such, an EIS is required for a plant license renewal review in accordance with the NEPA. The Petitioners challenge NUREG-1437, which generically assesses the significance of various environmental impacts associated with the renewal of nuclear power plant licenses. NUREG-1437 summarizes the findings of a systematic inquiry into the potential environmental consequences of operating individual nuclear power plants for an additional 20 years. The findings of NUREG-1437 are codified in Table B-1 of appendix B to subpart A of 10 CFR part 51.

The NUREG-1437 analysis identifies the attributes of the nuclear power plants, such as major features and plant systems, and the ways in which the plants can affect the environment. The analysis also identifies the possible refurbishment activities and modifications to maintenance and operating procedures that might be undertaken given the requirements of the safety review as provided for in the NRC's nuclear power plant license renewal regulations at 10 CFR part 54.

NUREG-1437 assigns one of three impact levels (small, moderate, or large) to a given environmental resource (e.g., air, water, or soil). A small impact means that the environmental effects are not detectable, or are so minor that they will 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 to destabilize, important attributes of the resource. A large impact means that the

environmental effects are clearly noticeable, and are sufficient to destabilize important attributes of the resource.

In addition to determining the significance of environmental impacts associated with license renewal, the NRC determined whether the analysis in NUREG-1437 for a given resource can be applied to all plants. Under the NUREG-1437 analysis, impacts will be considered Category 1 or Category 2. A Category 1 determination means that the environmental impacts associated with that resource are generic (i.e., the same) for all plants. A Category 2 determination means that the environmental impacts associated with that resource cannot be generically assessed, and must be assessed on a plant-specific basis.

The NRC regulations at 10 CFR part 51, subpart A, appendix B, Table B-1 and NUREG-1437 set forth three criteria for an issue to be classified as Category 1. The first criterion is that the environmental impacts associated with that resource have been determined to apply to all plants. The second criterion is that a single significance level (i.e., small, moderate, or large) has been assigned to the impacts.¹ The third criterion is that the mitigation of any adverse impacts associated with the resource has been considered in NUREG-1437 and further, it has been determined that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation. For Category 1 issues, the generic analysis may be adopted in each plant-specific license renewal review.

A Category 2 classification means that the NUREG-1437 analysis does not meet the criteria of Category 1. Thus, on that particular environmental issue, additional plant-specific review is required and must be analyzed by the license renewal applicant in its ER.

For each license renewal application, the NRC will prepare a draft supplemental EIS (SEIS) to analyze those plant-specific (Category 2) issues. Neither the SEIS nor the ER is required to cover Category 1 issues. However, both are required to consider any new and significant information for Category 1 or unidentified issues. The draft SEIS is made available for public comment. After considering public comments, the NRC will prepare and issue the final SEIS in accordance with 10 CFR 51.91 and 51.93. The final SEIS and NUREG-

¹ A note to Table B-1 states that significance levels have not been assigned "for collective off site radiological impacts from the fuel cycle and from high level waste and spent fuel disposal." 10 CFR part 51, subpart A, app. B, Table B-1, n. 2.

1437, together, serve as the requisite NEPA analysis for any given license renewal application.

The NUREG-1437 analysis, as shown in Table B-1 of appendix B to subpart A of 10 CFR part 51, found that the environmental impact of the storage of spent nuclear fuel, including high-density storage, in SFPs, during any plant refurbishment or plant operation through the license renewal term, are of a small significance level and meet all Category 1 criteria. It is this finding that the Petitioners challenge. After reviewing the petitions and the public comments received, the NRC has determined that its findings in NUREG-1437 and in Table B-1 remain valid, both for SFP accidents and for potential terrorist attacks that could result in an SFP zirconium fire.

V. Reasons for Denial—General

A. Spent Fuel Pools

Spent nuclear fuel offloaded from a reactor is stored in a SFP. The SFPs at all nuclear plants in the United States 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). SFPs are made of thick, reinforced, concrete walls and floors lined with welded, stainless-steel plates to form a leak-tight barrier. Racks fitted in the SFPs store the fuel assemblies in a controlled configuration (i.e., so that the fuel is both sub-critical and in a coolable geometry). Redundant monitoring, cooling, and makeup-water systems are provided. The spent fuel assemblies are positioned in racks at the bottom of the pool, and are typically covered by at least 25 feet of water. SFPs are essentially passive systems.

The water in the SFPs provides radiation shielding and spent fuel assembly cooling. It also captures radionuclides in case of fuel rod leaks. The water in the pool is circulated through heat exchangers for cooling. Filters capture any radionuclides and other contaminants that get into the water. Makeup water can also be added to the pool to replace water loss.

SFPs are located at reactor sites, typically within the fuel-handling (pressurized-water reactor) or reactor building (boiling-water reactor). From a structural point of view, nuclear power plants are designed to protect against external events such as tornadoes, hurricanes, fires, and floods. These structural features, complemented by the deployment of effective and visible

physical security protection measures, are also deterrents to terrorist activities. Additionally, the emergency procedures and SAMA guidelines developed for reactor accidents provide a means for mitigating the potential consequences of terrorist attacks.

B. Physical Security

The Petitioners raise the possibility of a successful terrorist attack as increasing the probability of an SFP zirconium fire. As the NAS Report found, the probability of terrorist attacks on SFPs cannot be reliably assessed, quantitatively or comparatively. The NRC has determined, however, that security and mitigation measures the NRC has imposed upon its licensees since September 11, 2001, and national anti-terrorist measures to prevent, for example, aircraft hijackings, coupled with the robust nature of SFPs, make the probability of a successful terrorist attack, though numerically indeterminable, very low.

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 to periodically demonstrate proficiency through tests and exercises.² In addition, reactor physical security systems use a defense-in-depth concept, involving the following:

- Vehicle (external) barriers.
- Fences.
- Intrusion detection, alarm, and assessment systems.
- Internal barriers.
- Armed responders.
- Redundant alarm stations with command, control, and communications systems.
- Local law enforcement authority's response to a site and augmentation of the on-site armed response force.
- Security and emergency-preparedness procedure development and planning efforts with local officials.
- Security personnel training and qualification.

The NRC's regulatory approach for maintaining the safety and security of power reactors, and thus 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).³ In addition, other Federal agencies such as the Federal Aviation Administration, the Federal Bureau of Investigation, and the Department of Homeland Security have taken aggressive steps to prevent terrorist attacks in the United States. 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.

C. Very Low Risk

Risk is defined as the probability of the occurrence of a given event multiplied by the consequences of that event.⁴ Studies conducted over the last three decades have consistently shown that the probability of an accident causing a zirconium fire in an SFP to be lower than that for severe reactor accidents. The risk of beyond design-basis accidents (DBAs) in SFPs was first examined as part of the landmark *Reactor Safety Study: An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants* (WASH-1400, NUREG-75/014, 1975), and was found to be several orders of magnitude below those involving the reactor core. The risk of an SFP accident was re-examined in the 1980's as Generic Issue 82, *Beyond Design Basis Accidents in Spent Fuel Pools*, in light of increased use of high-density storage racks and laboratory studies that indicated the possibility of zirconium fire propagation between assemblies in an air-cooled environment. The risk assessment and cost-benefit analyses developed through this effort, NUREG-1353, *Regulatory Analysis for the Resolution of Generic Issue 82, Beyond Design Basis Accidents in Spent Fuel Pools*, Section 6.2, April 1989, concluded that the risk of a severe accident in the SFP was low and "appear[s] to meet" the objectives of the Commission's "Safety Goals for the Operations of Nuclear Power Plants; Policy Statement," (August 4, 1986; 51

FR 28044), as amended (August 21, 1986; 51 FR 30028), and that no new regulatory requirements were warranted.⁵

SFP accident risk was re-assessed in the late 1990s to support a risk-informed rulemaking for permanently shutdown, or decommissioned, nuclear power plants. The study, NUREG-1738, *Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants*, January 2001, conservatively assumed that if the water level in the SFP dropped below the top of the spent fuel, an SFP zirconium fire involving all of the spent fuel would occur, and thereby bounded those conditions associated with air cooling of the fuel (including partial-draindown scenarios) and fire propagation. Even when all events leading to the spent fuel assemblies becoming partially or completely uncovered were assumed to result in an SFP zirconium fire, the study found the risk of an SFP fire to be low and well within the Commission's Safety Goals.

Furthermore, significant additional analyses have been performed since September 11, 2001, that support the view that the risk of a successful terrorist attack (i.e., one that results in an SFP zirconium fire) is very low. These analyses were conducted by the Sandia National Laboratories and are collectively referred to herein as the "Sandia studies."⁶ The Sandia studies

⁵ The Commission's Safety Goals identified two quantitative objectives concerning mortality risks: (1) The risk to an average individual in the vicinity of a nuclear power plant of prompt fatalities that might result from reactor accidents should not exceed one-tenth of one percent (0.1 percent) of the sum of prompt fatality risks resulting from other accidents in which members of the U.S. population are generally exposed; and (2) The risk to the population in the area near a nuclear power plant of cancer fatalities that might result from nuclear power plant operation should not exceed one-tenth of one percent (0.1 percent) of the sum of cancer fatality risks resulting from all other causes.

⁶ Sandia National Laboratories, "Mitigation of Spent Fuel Pool Loss-of-Coolant Inventory Accidents and Extension of Reference Plant Analyses to Other Spent Fuel Pools," Sandia Letter Report, Revision 2 (November 2006) incorporates and summarizes the Sandia Studies. This document is designated "Official Use Only—Security Related Information." A version of the Sandia Studies, with substantial redactions, was made public as a response to a Freedom of Information Act request. It is available on the NRC's Agencywide Document Access and Management System (ADAMS). The redacted version can be found under ADAMS Accession No. ML062290362. For access to ADAMS, contact the NRC Public Document Room Reference staff at 1-800-397-4209; 301-415-4737, or by e-mail to pdr.resource@nrc.gov. For additional related information, please see the NRC fact sheet "NRC Review of Paper on Reducing Hazards From Stored Spent Nuclear Fuel," which is available on the NRC's public Web site at: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/reducing-hazards-spent-fuel.html>.

² For additional related information, please see the NRC fact sheet "NRC Review of Paper on Reducing Hazards From Stored Spent Nuclear Fuel," which is available on the NRC's public Web site at: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/reducing-hazards-spent-fuel.html>.

³ The DBT represents the largest threat against which a private sector facility can be reasonably expected to defend with high assurance. The NRC's DBT rule was published in the Federal Register on March 19, 2007 (72 FR 12705).

⁴ The American Society of Mechanical Engineers (ASME) "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," ASME RA-S-2002, defines risk as the probability and consequences of an event, as expressed by the risk "triplet" that is the answer to the following three questions: (1) What can go wrong? (2) How likely is it? and (3) What are the consequences if it occurs?

are sensitive security related information and are not available to the public. The Sandia studies considered spent fuel loading patterns and other aspects of a pressurized-water reactor SFP and a boiling-water reactor SFP, including the role that the circulation of air plays in the cooling of spent fuel. The Sandia studies indicated that there may be a significant amount of time between the initiating event (i.e., the event that causes the SFP water level to drop) and the spent fuel assemblies becoming partially or completely uncovered. In addition, the Sandia studies indicated that for those hypothetical conditions where air cooling may not be effective in preventing a zirconium fire (i.e., the partial drain down scenario cited by the Petitioners), there is a significant amount of time between the spent fuel becoming uncovered and the possible onset of such a zirconium fire, thereby providing a substantial opportunity for both operator and system event mitigation.

The Sandia studies, which more fully account for relevant heat transfer and fluid flow mechanisms, also indicated 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 previously considered (e.g., in NUREG-1738). Thus, the fuel is more easily cooled, and the likelihood of an SFP fire is therefore reduced.

Additional mitigation strategies implemented subsequent to September 11, 2001, enhance spent fuel coolability and the potential to recover SFP water level and cooling prior to a potential SFP zirconium fire. The Sandia studies 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.

Given the physical robustness of SFPs, the physical security measures, and SFP mitigation measures, and based upon NRC site evaluations of every SFP in the United States, the NRC has determined that the risk of an SFP zirconium fire, whether caused by an accident or a terrorist attack, is very low. As such, the NRC's generic findings in NUREG-1437, as further reflected in Table B-1 of appendix B to subpart A of 10 CFR part 51, remain valid.

VI. Reasons for Denial—NRC Responses to Petitioners' Assertions

A. New and Significant Information

The Petitioners asserted that new and significant information shows that the NRC incorrectly characterized the environmental impacts of spent fuel storage as "insignificant." The information relied upon by the Petitioners, however, is neither "new" nor "significant," within the NRC's definition of those terms. The NRC defines these terms in its Supplement 1 to NRC Regulatory Guide 4.2, *Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses*, Chapter 5 (September 2000) (RG 4.2S1). "New and significant" information, which would require supplementing NUREG-1437, is defined as follows:

(1) Information that identifies a significant environmental issue that was not considered in NUREG-1437 and, consequently, not codified in Appendix B to Subpart A of 10 CFR Part 51, or

(2) Information that was not considered in the analyses summarized in NUREG-1437 and that leads to an impact finding different from that codified in 10 CFR Part 51.

The Petitioners' "new and significant" information does not meet the RG 4.2S1 criteria. NUREG-1437 (Sections 6.4.6.1. to 6.4.6.3.), and the analyses cited therein, including the NRC's "Waste Confidence Rule" (September 18, 1990; 55 FR 38474, 38480-81), extensively considered the risk of SFP accidents. Moreover, to the extent any information submitted by the Petitioners was not considered in NUREG-1437, none of the information is "significant," because, as explained further in this document, it would not lead to "an impact finding different from that codified in 10 CFR Part 51," or as set forth in NUREG-1437.

B. Spent Fuel Assemblies Will Burn If Uncovered

The Petitioners asserted that new and significant information, consisting primarily of the Thompson Report, NUREG-1738, and a government-sponsored study, the NAS Report, show that spent fuel will burn if the water level in an SFP drops to the point where the tops of the fuel assemblies are uncovered. Specifically, the Petitioners asserted that the NRC fails to recognize the danger of a partial loss of water in an SFP, which in the Petitioners' view, is more likely to cause an SFP zirconium fire than a complete loss of water, because the remaining water will block the circulating air that would

otherwise act to cool the spent fuel assemblies.

The NRC does not agree with the Petitioners' assertions. The NRC has determined that a zirconium cladding fire does not occur when only the tops of the fuel assemblies are uncovered. In reality, a zirconium fire cannot occur unless fuel uncovering is more substantial. Even then, the occurrence of a zirconium fire requires a number of conditions which are extremely unlikely to occur together. The Sandia studies provide a more realistic assessment of the coolability of spent fuel under a range of conditions and a better understanding of the actual safety margins than was indicated in NUREG-1738. The Sandia studies have consistently and conclusively shown that the safety margins are much larger than indicated by previous studies such as NUREG-1738.

1. Heat Transfer Mechanisms

Past NRC studies of spent fuel heatup and zirconium fire initiation conservatively did not consider certain natural heat-transfer mechanisms which would serve to limit heatup of the spent fuel assemblies and prevent a zirconium fire. In particular, these studies, including NUREG-1738, did not consider heat transfer from higher-decay-power assemblies to older, lower-decay-power fuel assemblies in the SFP. This heat transfer would substantially increase the effectiveness of air cooling in the event the SFP is drained, far beyond the effectiveness of air cooling cited in past studies. Both the Sandia studies and the NAS Report confirm the NRC conclusion that such heat transfer mechanisms allow rapid heat transfer away from the higher-powered assemblies. The NAS Report also noted that such heat transfer could air-cool the assemblies to prevent a zirconium fire within a relatively short time after the discharge of assemblies from the reactor to the SFP.⁷ Thus, air cooling is an effective, passive mechanism for cooling spent fuel assemblies in the pool.

2. Partial Drain-Down

Air cooling is less effective under the special, limited condition where the water level in the SFP drops to a point where water and steam cooling is not sufficient to prevent the fuel from overheating and initiating a zirconium fire, but the water level is high enough to block the full natural circulation of air flow through the assemblies. This condition has been commonly referred to as a partial draindown, and is cited in the Thompson Report. Under those

⁷NAS Report at 53.

conditions, however, it is important to realistically model the heat transfer between high- and low-powered fuel assemblies. The heat transfer from hot fuel assemblies to cooler assemblies will delay the heat-up of assemblies, and allow plant operators time to take additional measures to restore effective cooling to the assemblies. Further, for very low-powered assemblies, the downward flow of air into the assemblies can also serve to cool the assembly even though the full-circulation flow path is blocked. Also, as discussed further in this document, all nuclear plant SFPs have been assessed to identify additional, existing cooling capability and to provide new supplemental cooling capability which could be used during such rare events. This supplemental cooling capability specifically addresses the cooling needs during partial draindown events, and would reduce the probability of a zirconium fire even during those extreme events.

3. License Amendments

In January 2006, the nuclear industry proposed a combination of internal and external strategies to enhance the spent fuel heat removal capability systems at every operating nuclear power plant. The internal strategy implements a diverse SFP makeup system that can supply the required amount of makeup water and SFP spray to remove decay heat. The external strategy involves using an independently-powered, portable, SFP coolant makeup and spray capability system that enhances spray and rapid coolant makeup to mitigate a wide range of possible scenarios that could reduce SFP water levels. In addition, in cases where SFP water levels can not be maintained, leakage control strategies would be considered along with guidance to maximize spray flows to the SFP. Time lines have been developed that include both dispersed and non-dispersed spent fuel storage. The NRC has approved license amendments and issued safety evaluations to incorporate these strategies into the plant licensing bases of all operating nuclear power plants in the United States.

C. Fuel Will Burn Regardless of Its Age

The NRC disagrees with the Petitioners' assertion that fuel will burn regardless of age. Older fuel (fuel which has been discharged from the reactor for a longer time) is more easily cooled and is less likely to ignite because of its lower decay power. A study relied upon by the Petitioners, NUREG-1738, did conservatively assume that spent fuel stored in an SFP, regardless of age, may

be potentially vulnerable to a partial drain down event, and that the possibility of a zirconium fire could not be ruled out on a generic basis. This conclusion, however, was in no sense a statement of certainty and was made in order to reach a conclusion on a generic basis, without relying on any plant-specific analyses.

Furthermore, the SFP zirconium fire frequency in NUREG-1738 was predicated on a bounding, conservative assumption that an SFP fire involving all of the spent fuel would occur if the water level in the SFP dropped below the top of the spent fuel. The NUREG-1738 analysis did not attempt to specifically address a number of issues and actions that would substantially reduce the likelihood of a zirconium fire, potentially rendering the frequency estimate to be remote and speculative. For example, NUREG-1738 did not account for the additional time available following the spent fuel being partially or completely uncovered, but prior to the onset of a zirconium fire, that would allow for plant operator actions, makeup of SFP water levels, and other mitigation measures. In addition, NUREG-1738 did not consider the impact of plant and procedure changes implemented as a result of the events of the September 11, 2001, terrorist attacks. NUREG-1738 did clarify that the likelihood of a zirconium fire under such conditions could be reduced by accident management measures, but it was not the purpose of NUREG-1738 to evaluate such accident management measures.

D. SFP Zirconium Fire Will Propagate

Although it is possible that once a spent fuel assembly ignites, the zirconium fire can propagate to other assemblies in the SFP, the NRC has determined (as explained previously) that the risk of an SFP zirconium fire initiation is very low.

E. SFP Zirconium Fire May Be Catastrophic

1. Not New and Significant Information; Very Low Probability

The Massachusetts AG states that "while such a catastrophic accident is unlikely, its probability falls within the range that NRC considers reasonably foreseeable." Thus, the Petitioners asserted that an SFP zirconium fire qualifies as a DBA and, that the impacts of an SFP fire must be discussed in the ER submitted by the licensee and the NRC's EIS, as well as designed against under NRC safety regulations.

The facts that a SFP contains a potentially large inventory of

radionuclides and that a release of that material could have adverse effects are not new. These facts are well known, and were considered in the risk evaluation of spent fuel storage contained in NUREG-1738. Even with the numerous conservatisms in the NUREG-1738 study, as described previously, the NRC was able to conclude that the risk from spent fuel storage is low, and is substantially lower than reactor risk.

A study relied upon by the Petitioners, the Thompson Report, claimed that the probability (frequency) of an SFP zirconium fire would be 2E-5 per year⁸ for events excluding acts of malice (e.g., terrorism) and 1E-4 per year⁹ for acts of malice. With respect to random events (i.e., excluding acts of malice), the NRC concludes that the Thompson Report estimate is overly conservative. A more complete and mechanistic assessment of the event, as described in section VI.E.2. of this Notice, and associated mitigation measures, leads to considerably lower values. With respect to events initiated by a terrorist attack, the NRC concludes that such probability (frequency) estimates are entirely speculative. The NRC also concludes that the additional mitigation measures for SFP events implemented since September 11, 2001, together with the more realistic assessment of spent fuel cooling, indicates that the likelihood of a zirconium fire, though numerically indeterminable, is very low.

The 2E-5 per year estimate for events excluding acts of malice is based on an unsubstantiated assumption that 50 percent of all severe reactor accidents that result in an early release of substantial amounts of radioactive material will also lead to a consequential SFP zirconium fire. The Thompson Report does not identify the necessary sequence of events by which such scenarios might lead to SFP zirconium fires, or discuss the probability of their occurrence. The NRC analysis in the Shearon Harris ASLBP proceeding (described in section VI.E.2. of this Notice) showed that a more complete and mechanistic assessment of the event and associated mitigation measures leads to considerably lower values. This assessment includes the following:

- Frequency and characteristics of the releases from the containment for each release location;
- Transport of gases and fission products within the reactor building;

⁸ Two occurrences in 100,000 reactor years.

⁹ One occurrence in 10,000 reactor years.

- Resulting thermal and radiation environments in the reactor building, with emphasis on areas in which SFP cooling and makeup equipment is located, and areas in which operator access may be needed to implement response actions;

- Availability/survivability of SFP cooling and makeup equipment in the sequences of concern; and
- Ability and likelihood of successful operator actions to maintain or restore pool cooling or makeup (including consideration of security enhancements and other mitigation measures implemented in response to the terrorist attacks of September 11, 2001).

2. Shearon Harris Atomic Safety and Licensing Board Panel (ASLBP) Proceeding

In the proceeding regarding the expansion of the SFP at the Shearon Harris nuclear power plant, located near Raleigh, North Carolina, the Shearon Harris intervenor described a scenario similar to that raised by the Petitioners, namely, that a severe accident at the adjacent reactor would result in a SFP zirconium fire.¹⁰ The Shearon Harris proceeding considered the probability of a sequence of the following seven events:

- A degraded core accident.
- Containment failure or bypass.
- Loss of SFP cooling.
- Extreme radiation levels precluding personnel access.
- Inability to restart cooling or makeup systems due to extreme radiation doses.
- Loss of most or all pool water through evaporation.
- Initiation of a zirconium fire in the SFP.

Based on a detailed probabilistic risk assessment, the licensee calculated the probability of a severe reactor accident that causes an SFP zirconium fire to be 2.78E-8 per year. The NRC staff calculated the probability to be 2.0E-7 per year. The intervenor calculated the probability to be 1.6E-5 per year. The ASLBP concluded that the probability of the postulated sequence of events resulting in an SFP zirconium fire was "conservatively in the range described by the Staff: 2.0E-7 per year (two occurrences in 10 million reactor years) or less."¹¹ Accordingly, the ASLBP found that the occurrence of a severe reactor accident causing an SFP zirconium fire "falls within the category of remote and speculative matters."¹²

The Commission affirmed the ASLBP's decision, and the United States Court of Appeals, District of Columbia Circuit, upheld the Commission decision.¹³

In the Shearon Harris proceeding, the intervenor assumed that, given an early containment failure or bypass, a spent fuel zirconium fire would occur (i.e., a conditional probability of 1.0). In order for a reactor accident to lead to a SFP zirconium fire a number of additional conditions must occur. The reactor accident and containment failure must somehow lead to a loss of SFP cooling and must lead to a condition where extreme radiation levels preclude personnel access to take corrective action. There must be then an inability to restart cooling or makeup systems. There must be a loss of significant pool water inventory through evaporation (which can take substantial time). Finally, the event must also lead to a zirconium fire. In contrast to the intervenor's estimate, the licensee and the NRC staff estimated a conditional probability of about one percent that a severe reactor accident with containment failure would lead to a SFP accident. The NRC staff expects that the conditional probability of a SFP zirconium fire, given a severe reactor accident, would be similar to that established in the Shearon Harris proceeding. As such, 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.

The 1E-4 per year estimate in the Thompson Report for events involving acts of malice assumes that there would be one attack on the population of U.S. nuclear power plants per century, and that this attack will be 100 percent successful in producing a SFP zirconium fire (thus, fire frequency = 0.01 attack/year × 1.0 fire/attack × 1/104 total reactors = 1E-4/year). The security-related measures and other mitigation measures implemented since September 11, 2001, however, have significantly reduced the likelihood of a successful terrorist attack on a nuclear power plant and its associated SFP. Such measures include actions that would improve the likelihood of the following:

- Identifying/thwarting the attack before it is initiated.
- Mitigating the attack before it results in damage to the plant.

- Mitigating the impact of the plant damage such that an SFP zirconium fire is avoided.

Given the implementation of additional security enhancements and mitigation strategies, as well as further consideration of the factors identified above, the NRC staff concludes that the frequency of SFP zirconium fires due to acts of malice is substantially lower than assumed by the Petitioners.

3. SFP Zirconium Fire Does Not Qualify As a DBA

Regarding the Petitioners' assertion that a SFP zirconium fire qualifies as a design-basis accident (DBA), the NRC staff has concluded that a realistic probability estimate would be very low, such that these events need not be considered as DBAs or discussed in ERs and EISs. Moreover, the set of accidents that must be addressed as part of the design basis has historically evolved from deterministic rather than probabilistic considerations. These considerations, which include defense-in-depth, redundancy, and diversity, are characterized by the use of the single-failure criterion.¹⁴ The single-failure criterion, as a key design and analysis tool, has the direct objective of promoting reliability through the enforced provision of redundancy in those systems which must perform a safety-related function. The single failure criterion is codified in Appendix A and Appendix K to 10 CFR Part 50 and other portions of the regulations. The SFP and related systems have been designed and approved in accordance with this deterministic approach.

F. Intentional Attack on a SFP is "Reasonably Foreseeable."

The Petitioners asserted that an intentional attack targeting a plant's SFP is "reasonably foreseeable." Specifically, the Petitioners raised both the NAS study and the decision by the United States Court of Appeals for the Ninth Circuit, *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), cert. denied 127 S. Ct. 1124 (2007), to support the assertion that the NRC's NEPA analysis of a license renewal action for a given facility must include analysis of the environmental impacts associated with a terrorist attack on that facility. The NRC has

¹⁴ "A single failure means an occurrence which results in the loss of capability of a component to perform its intended safety functions * * * Fluid and electric systems are considered to be designed against an assumed single failure if neither (1) a single failure of any active component * * * nor (2) a single failure of a passive component * * * results in a loss of the capability of the system to perform its safety functions." 10 CFR Part 50, App. A.

¹⁰ *Carolina Power Light Co.*, LBP-01-9, 53 NRC 239, 244-245 (2001).

¹¹ *Id.*, 53 NRC at 267.

¹² *Id.*, 53 NRC at 268.

¹³ *Carolina Power Light Co.*, Commission Law Issuance (CLI)-01-11, 53 NRC 370 (2001), *pet. for review denied, sub nom. Orange County, NC v. NRC*, 47 Fed. Appx. 1, 2002 WL 31098379 (D.C. Cir. 2002).

considered both the NAS Report and the Ninth Circuit decision, and remains of the view that an analysis of the environmental impacts of a hypothetical terrorist attack on an NRC-licensed facility is not required under NEPA.¹⁵ But, if an analysis of a hypothetical terrorist attack were required under NEPA, the NRC has determined that the environmental impacts of such a terrorist attack would not be significant, because the probability of a successful terrorist attack (i.e., one that causes an SFP zirconium fire, which results in the release of a large amount of radioactive material into the environment) is very low and therefore, within the category of remote and speculative matters.

1. NAS Report

The Petitioners rely, in part, upon the NAS Report, the public version of which was published in 2006 and is available from NAS.¹⁶ In response to a direction in the Conference Committee's Report accompanying the NRC's FY 2004 appropriation,¹⁷ the NRC contracted with NAS for a study on the safety and security of commercial spent nuclear fuel. The NAS made a number of findings and recommendations, including:

- SFPs are necessary at all operating nuclear power plants to store recently discharged fuel;
- Successful terrorist attacks on SFPs, though difficult, are possible;
- The probability of terrorist attacks on spent fuel storage cannot be assessed quantitatively or comparatively;
- If a successful terrorist attack leads to a propagating zirconium cladding fire, it could result in the release of large amounts of radioactive material; and
- Dry cask storage has inherent security advantages over spent fuel

¹⁵ In the wake of the Ninth Circuit's *Mothers for Peace* decision, the Commission decided against applying that holding to all licensing proceedings nationwide. See, e.g., *Amergen Energy Co. LLC* (Oyster Creek Nuclear Generating Station), CLI-07-8, 65 NRC 124, 128-29 (2007), *pet. for judicial review pending*, No. 07-2271 (3d Cir.). The Commission will, of course, adhere to the Ninth Circuit decision when considering licensing actions for facilities subject to the jurisdiction of that Circuit. See *id.* Thus, on remand in the *Mothers for Peace* case itself, the Commission is currently adjudicating intervenors' claim that the NRC Staff has not adequately assessed the environmental consequences of a terrorist attack on the Diablo Canyon Power Plant's proposed facility for storing spent nuclear fuel in dry casks. See, *Pacific Gas & Elec. Co.*, CLI-07-11, 65 NRC 148 (2007). The Commission's ultimate decision in that case will rest on the record developed in the adjudication.

¹⁶ The NRC response to the NAS Report is available at ADAMS Accession No. ML0502804280.

¹⁷ Conference Committee's Report (H. Rept. 108-357) accompanying the *Energy and Water Development Act, 2004* (Pub. L. 108-137, December 3, 2003).

storage, but it can only be used to store older spent fuel.

The NAS Report found, and the NRC agrees, that pool storage is required at all operating commercial nuclear power plants to cool newly discharged spent fuel. Freshly discharged spent fuel generates too much decay heat to be placed in a dry storage cask.

The NRC agrees with the NAS finding that the probability of terrorist attacks on spent fuel storage cannot be assessed quantitatively or comparatively. However, the NRC concludes that the additional mitigation measures for SFP events implemented since September 11, 2001, together with a more realistic assessment of spent fuel cooling, as shown by the Sandia studies, indicates that the likelihood of a zirconium fire, though numerically indeterminate, is very low.

Furthermore, the NAS Report states that "[i]t is important to recognize, however, that an attack that damages a power plant or its spent fuel storage facilities would not necessarily result in the release of any radioactivity to the environment. There are potential steps that can be taken to lower the potential consequences of such attacks."¹⁸ The NAS Report observed that a number of security improvements at nuclear power plants have been instituted since September 11, 2001, although the NAS did not evaluate the effectiveness and adequacy of these improvements and has called for an independent review of such measures. Nevertheless, the NAS Report states that "the facilities used to store spent fuel at nuclear power plants are very robust. Thus, only attacks that involve the application of large energy impulses or that allow terrorists to gain interior access have any chance of releasing substantial quantities of radioactive material."¹⁹

As discussed previously, following the terrorist attacks of September 11, 2001, the NRC has required that nuclear power plant licensees implement additional security measures and enhancements the Commission believes have made the likelihood of a successful terrorist attack on an SFP remote.

2. Ninth Circuit Decision

The Petitioners asserted that the NRC should follow the decision of the United States Court of Appeals for the Ninth Circuit, *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), *cert. denied* 127 S. Ct. 1124 (2007), by considering the environmental impacts of intentional attacks on nuclear power plant fuel

storage pools in all licensing decisions. The Ninth Circuit held that the NRC could not, under NEPA, categorically refuse to consider the consequences of a terrorist attack against a spent fuel storage facility on the Diablo Canyon reactor site.

The NRC's longstanding view is that NEPA does not require the NRC to consider the environmental consequences of hypothetical terrorist attacks on NRC-licensed facilities. NEPA requires that there be a "reasonably close causal relationship" between the federal agency action and the environmental consequences.²⁰ The NRC renewal of a nuclear power plant license would not cause a terrorist attack; a terrorist attack would be caused by the terrorists themselves. Thus, the renewal of a nuclear power plant license would not be the "proximate cause" of a terrorist attack on the facility.

If NEPA required the NRC to consider the impacts of a terrorist attack, however, the NRC findings would remain unchanged. As previously described, the NRC has required, and nuclear power plant licensees have implemented, various security and mitigation measures that, along with the robust nature of SFPs, make the probability of a successful terrorist attack (i.e., one that causes an SFP zirconium fire, which results in the release of a large amount of radioactive material into the environment) very low. As such, a successful terrorist attack is within the category of remote and speculative matters for NEPA considerations; it is not "reasonably foreseeable." Thus, on this basis, the NRC finds that the environmental impacts of renewing a nuclear power plant license, in regard to a terrorist attack on an SFP, are not significant.

The NRC has 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.

G. SFP Zirconium Fire Should Be Considered Within the Analysis of SAMAs

The Petitioners asserted that SFP fires should be considered within the analysis of severe accident mitigation alternatives (SAMAs). While a large radiological release is still possible, and

²⁰ *Department of Transportation v. Public Citizen*, 541 U.S. 752, 767 (2004) citing *Metropolitan Edison v. People Against Nuclear Energy*, 460 U.S. 766, 774 (1983).

¹⁸ NAS Report at 6 (emphasis in the original).

¹⁹ NAS Report at 30.

was assessed as part of Generic Issue 82, *Beyond Design Basis Accidents in Spent Fuel Pools*, and later, in NUREG-1738, the NRC considers the likelihood of such an event to be lower than that estimated in Generic Issue 82 and NUREG-1738. Based on the Sandia studies, and on the implementation of additional strategies implemented following September 11, 2001, the probability of a SFP zirconium fire is expected to be less than that reported in NUREG-1738 and previous studies. Thus, the very low probability of an SFP zirconium fire would result in an SFP risk level less than that for a reactor accident.

For example, in NUREG-1738, the SFP fire frequencies were conservatively estimated to be in the range of $5.8E-7$ per year to $2.4E-6$ per year. NUREG-1738 conservatively assumed that if the water level in the SFP dropped below the top of the spent fuel, an SFP zirconium fire involving all of the spent fuel would occur, and thereby bounded those conditions associated with air cooling of the fuel (including partial-drain down scenarios) and zirconium fire propagation. It did not mechanistically analyze the time between the spent fuel assemblies becoming partially or completely uncovered and the onset of a SFP zirconium fire, and the potential to recover SFP cooling and to restore the SFP water level within this time. NUREG-1738 also did not consider the possibility that air-cooling of the spent fuel alone could be sufficient to prevent SFP zirconium fires.

Furthermore, the Sandia studies indicated that air cooling would be much more effective in cooling the spent fuel assemblies. In those cases where air cooling is not effective, the time before fuel heatup and radiological release would be substantially delayed, thus providing a substantial opportunity for successful event mitigation. The Sandia studies, which more fully account for relevant heat transfer and fluid flow mechanisms, also indicated that air-cooling of spent fuel would be sufficient to prevent SFP zirconium fires much earlier following fuel offload than previously considered (e.g., in NUREG-1738), thereby further reducing the likelihood of an SFP zirconium fire. Additional mitigation strategies implemented subsequent to September 11, 2001, will serve to further enhance spent fuel coolability, and the potential to recover SFP cooling or to restore the SFP water level prior to the initiation of an SFP zirconium fire.

Given that the SFP risk level is less than that for a reactor accident, a SAMA that addresses SFP accidents would not

be expected to have a significant impact on total risk for the site. Despite the low level of risk from fuel stored in SFPs, additional SFP mitigative measures have been implemented by licensees since September 11, 2001. These mitigative measures further reduce the risk from SFP zirconium fires, and make it even more unlikely that additional SFP safety enhancements could substantially reduce risk or be cost-beneficial.

VII. Denial of Petitions

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.

Commissioner Gregory B. Jaczko's Dissenting View on the Commission's Decision To Deny Two Petitions for Rulemaking Concerning the Environmental Impacts of High-Density Storage of Spent Nuclear Fuel in Spent Fuel Pools

I disagree with the decision to deny the petition for rulemaking as included in this *Federal Register* notice. In general, I approve of the decision not to initiate a new rulemaking to resolve the petitioners' concerns, but because information in support of the petition will be considered when the staff undertakes the rulemaking to update the Generic Environmental Impact Statement for license renewal, I believe that the decision should have been to partially grant the petition rather than deny it.

The petitioners requested the agency review additional studies regarding spent fuel pool storage they believe would change the agency's current generic determination that the impacts of high-density pool storage are "small". I believe that the agency could commit to reviewing the information provided by the petitioners, along with any other new information, when the agency updates the Generic Environmental Impact Statement (GEIS) for License Renewal in the near future. Regardless of whether or not the information will change the GEIS' conclusions, at a minimum, the agency should be committing to ensure that this information is part of the analysis

performed by the staff upon the next update of the GEIS. While we can not predict the outcome of the significance level that will ultimately be assigned to the spent fuel category in the GEIS, it seems an obvious commitment to ensure that the ultimate designation will be appropriately based upon all information available to the staff at the time. Thus, I believe this decision should be explained as a partial granting of the petition. It may not provide the petitioners with everything they want, but it would more clearly state the obvious—that this information, and any other new information, will be reviewed by the agency and appropriately considered when the staff begins its update of the license renewal GEIS.

This specific issue illustrates a larger concern about how the agency handles petitions for rulemaking in general. I find it unfortunate that the agency appears to limit its responses to petitions based upon the vocabulary that has been established surrounding this program. Currently, when the agency discusses these petitions, we discuss them in the context of "granting" or "denying" the rulemaking petitions. We then appear to be less inclined to "grant" unless we are committing to the precise actions requested in the petition. But these petitions are, by their very definition, requests for rulemakings; which means, even if we do "grant" a petition for rulemaking, we can not guarantee a particular outcome for the final rule. The final rulemaking is the result of staff's technical work regarding the rule, public comments on the rule, and resolution of those comments. Rulemaking petitions are opportunities for our stakeholders to provide us with new ideas and approaches for how we regulate. By limiting our responses, we limit our review of the request, and thus, we risk missing many potential opportunities to improve the way we regulate.

Additional Views of the Commission

The Commission does not share Commissioner Jaczko's dissenting view. We appreciate his statement of concern about the petition for rulemaking (PRM) process, but believe these matters are extraneous to the Commission's analyses of the petitioners' technical bases for this particular rulemaking request and, consequently, they had no bearing on the majority view. Specifically, the Commission does not agree that the petitions should be granted in part on the basis of the agency's plan to update the Generic Environmental Impact Statement (GEIS) for License Renewal and make attendant

rule changes in the future. The Commission's detailed statement of reasons for denial of the petitions is the product of a careful review of the petitioners' assertions and other associated public comments, and is supported by the facts before us. In these circumstances, the Commission does not believe the petitioners' request can fairly, or reasonably, be "granted" in part based on a future undertaking which itself had no genesis in the petitioners' requests.

The Commission's timely and decisive action in response to the two petitions serves the interests of the Commission and other participants in an effective, disciplined, and efficient rulemaking petition process. In this instance, a decision now has particular value since it directly addresses the petitioners' statements of significant concern about certain, generic aspects of ongoing and future license renewal reviews. While the analyses performed to respond to these petitions will also undoubtedly inform NRC staff proposals regarding the next update of the GEIS, the Commission does not yet have such proposals before it. Any final Commission decisions on an updated GEIS would be preceded by proposed changes, solicitation of public comment, and evaluation of all pertinent information and public comments. Furthermore, a partial "granting" of the petition could imply that the Commission endorses the petitioners' requests and will give them greater weight than other points of view during the GEIS rulemaking.

As to the other matter raised in Commissioner Jaczko's dissent—that of agency review and disposition of petitions for rulemaking more generally—while petitions for rulemaking are indeed opportunities for stakeholders to suggest new considerations and approaches for regulation, Commissioner Jaczko's general concerns about the agency's process for handling rulemaking petitions go beyond the subject of the Commission's action on these petitions. However, this subject matter is being considered, as the Commission has instructed NRC staff [SRM dated August 6, 2007] to conduct a review of the agency's PRM process. At such time as staff may recommend, as an outgrowth of this review, specific proposals for Commission action which would strengthen the agency PRM process, the Commission will assess such recommendations and act on them, as appropriate.

Dated at Rockville, Maryland, this 1st day of August 2008.

For the Nuclear Regulatory Commission.
Annette L. Vietti-Cook,
Secretary of the Commission.
[FR Doc. E8-18291 Filed 8-7-08; 8:45 am]
BILLING CODE 7590-01-P

DEPARTMENT OF THE INTERIOR

Office of Surface Mining Reclamation and Enforcement

30 CFR Part 901

[SATS No. AL-074-FOR; Docket No. OSM-2008-0015]

Alabama Regulatory Program

AGENCY: Office of Surface Mining Reclamation and Enforcement, Interior.

ACTION: Proposed rule; public comment period and opportunity for public hearing on proposed amendment.

SUMMARY: We, the Office of Surface Mining Reclamation and Enforcement (OSM), are announcing receipt of a proposed amendment to the Alabama regulatory program (Alabama program) under the Surface Mining Control and Reclamation Act of 1977 (SMCRA or the Act). Alabama proposes revisions to its regulations regarding permit fees and civil penalties. Alabama intends to revise its program to improve operational efficiency.

This document gives the times and locations that the Alabama program and proposed amendment to that program are available for your inspection, the comment period during which you may submit written comments on the amendment, and the procedures that we will follow for the public hearing, if one is requested.

DATES: Comments on the proposed rule must be received on or before 4 p.m., c.t., September 8, 2008, to ensure our consideration. If requested, we will hold a public hearing on the amendment on September 2, 2008. We will accept requests to speak at a hearing until 4 p.m., c.t. on August 25, 2008.

ADDRESSES: You may submit comments by either of the following two methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. The proposed rule is listed under the agency name "OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT" and has been assigned Docket ID: OSM-2008-0015. If you would like to submit comments through the Federal eRulemaking Portal, go to www.regulations.gov and do the following. Click on the "Advanced Docket Search" button on the right side of the screen. Type in the Docket ID

OSM-2008-0015 and click the submit button at the bottom of the page. The next screen will display the Docket Search Results for the rulemaking. If you click on OSM-2008-0015, you can view the proposed rule and submit a comment. You can also view supporting material and any comments submitted by others.

- *Mail/Hand Delivery/Courier:* Sherry Wilson, Director, Birmingham Field Office, Office of Surface Mining Reclamation and Enforcement, 135 Gemini Circle, Suite 215, Homewood, Alabama 35209. Please include the Docket ID (OSM-2008-0015) with your comments.

We cannot ensure that comments received after the close of the comment period (see **DATES**) or sent to an address other than the two listed above will be included in the docket for this rulemaking and considered.

For additional information on the rulemaking process and the public availability of comments, see "III. Public Comment Procedures" in the **SUPPLEMENTARY INFORMATION** section of this document.

You may receive one free copy of the amendment by contacting OSM's Birmingham Field Office. See below for **FURTHER INFORMATION CONTACT**.

You may review a copy of the amendment during regular business hours at the following locations:

Sherry Wilson, Director, Birmingham Field Office, Office of Surface Mining Reclamation and Enforcement, 135 Gemini Circle, Suite 215, Homewood, Alabama 35209, Telephone: (205) 290-7282, swilson@osmre.gov.

Randall C. Johnson, Director, Alabama Surface Mining Commission, 1811 Second Avenue, P.O. Box 2390, Jasper, Alabama 35502-2390, Telephone: (205) 221-4130.

FOR FURTHER INFORMATION CONTACT: Sherry Wilson, Director, Birmingham Field Office. Telephone: (205) 290-7282. E-mail: swilson@osmre.gov.

SUPPLEMENTARY INFORMATION:

- I. Background on the Alabama Program
- II. Description of the Proposed Amendment
- III. Public Comment Procedures
- IV. Procedural Determinations

I. Background on the Alabama Program

Section 503(a) of the Act permits a State to assume primacy for the regulation of surface coal mining and reclamation operations on non-Federal and non-Indian lands within its borders by demonstrating that its program includes, among other things, " * * * a State law which provides for the regulation of surface coal mining and reclamation operations in accordance

United States Court of Appeals For the First Circuit

NOTICE OF APPEARANCE

No. _____ Short Title: Commonwealth of Massachusetts v. NRC

The Clerk will enter my appearance as counsel on behalf of *(please list names of all parties represented, using additional sheet(s) if necessary)*:

Commonwealth of Massachusetts as the

appellant(s) appellee(s) amicus curiae
 petitioner(s) respondent(s) intervenor(s)

The party I represented below is not a party to the appeal and I wish to be removed from the service list. Please list the names of all parties represented:



Signature

9/29/08

Date

Matthew Brock, Assistant Attorney General
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Firm Name (if applicable)

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Court of Appeals Bar Number: 13742

Has this case or any related case previously been on appeal?

No Yes Court of Appeals No. 07-1482 and 07-1483 (First Circuit); 08-3903-AG, State of NY v. US NRC & the United States (Second Circuit)

Attorneys for both appellant and appellee must file a notice of appearance within 14 days of case opening. New or additional counsel may enter an appearance outside the 14 day period; however, a notice of appearance may not be filed after the appellee/respondent brief has been filed without leave of court. 1st Cir. R. 12.0(a).

Counsel must complete and return this notice of appearance in order to file pleadings in this court. Counsel not yet admitted to practice before this court must submit an application for admission with the form. 1st Cir. R. 46.0(a)(2).

CERTIFICATE OF SERVICE

I, Matthew Brock, hereby certify that on September 29, 2008, copies of the foregoing Massachusetts Attorney General's Petition for Review of the U.S. Nuclear Regulatory Commission's Denial of Petitions for Rulemaking [PRM-51-10 and PRM-51-12] were served on the following counsel and other representatives of certain parties or participants to the rulemaking proceeding and the related license renewal hearings for the Pilgrim and Vermont Yankee Nuclear Power Stations, by first-class mail:

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