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08-4833-ag(CON); 08-5571-ag(CON)

United States Court of Appeals for the Second Circuit

THE STATE OF NEW YORK; RICHARD BLUMENTHAL, ATTORNEY GENERAL OF
THE STATE OF CONNECTICUT; AND THE COMMONWEALTH OF MASSACHUSETTS,

Petitioners,

v.

UNITED STATES NUCLEAR REGULATORY COMMISSION;
AND UNITED STATES OF AMERICA,

Respondents,

and

ENTERGY NUCLEAR OPERATIONS, INC.

Intervenor-Respondent.

On Petition For Review Of Final Action Of The
United States Nuclear Regulatory Commission

PETITIONERS' BRIEF and SPECIAL APPENDIX

BARBARA D. UNDERWOOD

Solicitor General

KATHERINE KENNEDY

Special Deputy Attorney General

BENJAMIN GUTMAN

Deputy Solicitor General

MONICA WAGNER

Assistant Solicitor General

JANICE A. DEAN

JOHN J. SIPOS

Assistant Attorneys General

ANDREW M. CUOMO

Attorney General of the

State of New York

Attorney for Petitioner

State of New York, in 08-3903-ag(L)

The Capitol

Albany, NY 12224

(518) 402-2251

(counsel listing continued on inside front cover)

Dated: May 5, 2009

(counsel listing continued from front cover)

RICHARD BLUMENTHAL
*Attorney General of the
State of Connecticut*
Attorney for Petitioner
State of Connecticut, in 08-4833-ag(CON)
ROBERT D. SNOOK
Assistant Attorney General
55 Elm Street
Hartford, CT 06141
(860) 808-5020

MARTHA COAKLEY
*Attorney General of
The Commonwealth of Massachusetts*
Attorney for Petitioner
The Commonwealth of Massachusetts,
in 08-5571-ag(CON)
MATTHEW BROCK
Assistant Attorney General
McCormack Building
1 Ashburton Place
Boston, MA 02108-1598
(617) 727-2200

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PRELIMINARY STATEMENT

Nuclear power plants routinely store radioactive spent fuel in pools of water located outside the protective containment shells that surround nuclear reactors. In 1996, the Nuclear Regulatory Commission found in a generic environmental impact statement (“EIS”) that those pools have no significant environmental impacts and promulgated regulations providing that no further analysis of the impacts of spent-fuel pools would be required under the National Environmental Policy Act. As a result, when NRC conducts an environmental analysis of a nuclear power plant in connection with the renewal of a plant’s license, it relies on the 1996 generic EIS and does not conduct any plant-specific analysis of whether the plant’s spent-fuel pools have significant environmental impacts, regardless of the design or age of the pools or the effectiveness of the measures the plant takes to prevent or mitigate any such impacts.

In 2006 and 2007, Massachusetts and California filed rulemaking petitions asking NRC to reverse its 1996 generic finding that spent-fuel pools have no significant environmental impacts. The petitions presented new information — including a report issued by NRC staff — showing that the spent fuel stored in a pool can catch fire, either by

accident or due to a terrorist attack, and release significant amounts of radiation to the surrounding area. New York supported both of those petitions and submitted additional information showing that several spent-fuel pools, including the pools at the Indian Point nuclear power plant on the Hudson River, had leaked radioactive material. Connecticut, Vermont, and several other States also supported Massachusetts's petition.

NRC refused to reconsider its 1996 generic finding that spent-fuel pools have no significant environmental impacts and denied the rulemaking petitions. NRC's refusal was based on its findings that plant-specific mitigation measures made the risk of a spent-fuel pool fire very low and that plant-specific security measures made the risk of terrorist attack remote and speculative. NRC also found that it is not required to consider the environmental impacts of a terrorist attack when it renews a plant's license because the license renewal would not be the proximate cause of such an attack. NRC's decision did not discuss the environmental consequences of leaks from spent-fuel pools.

In these consolidated petitions for review filed by New York, Massachusetts, and Connecticut, this Court should reverse NRC's

decision denying the rulemaking petitions. First, NRC's reliance on plant-specific security and mitigation measures to uphold the determination in the 1996 generic EIS that spent-fuel pools have no environmental impacts contradicts NRC's own finding in that EIS that those impacts could be analyzed on a generic basis, without considering any plant-specific measures. Second, the new information submitted by the States shows that the risk of a spent-fuel pool catching on fire by accident or due to intentional sabotage is neither remote nor speculative. And NRC must consider the environmental consequences of a terrorist attack because, although it would not be responsible for an attack, it has the ability to mitigate the consequences of an attack. Third, NRC failed even to consider the effects of leaks from spent-fuel pools. Finally, in denying the rulemaking petitions, NRC relied primarily on a study that it had not released — even in redacted form — for public review, thus depriving the States of an opportunity to comment on the primary basis for NRC's conclusions.

JURISDICTIONAL STATEMENT

NRC had jurisdiction to decide Massachusetts's and California's petitions for rulemaking under the Atomic Energy Act, 42 U.S.C. § 2239(a)(1)(A), and the Administrative Procedure Act, 5 U.S.C. § 553(e). The Court has jurisdiction under the Hobbs Act, 28 U.S.C. § 2342(4), to review NRC's denial of those petitions. *See Fla. Power & Light Co. v. Lorion*, 470 U.S. 729, 746 (1985). New York, Connecticut, and Massachusetts filed petitions for review within sixty days of that denial, as required by the Hobbs Act, 42 U.S.C. § 2344.

New York, Connecticut, and Massachusetts also have standing to seek judicial review of NRC's denial. The Atomic Energy Act and the Administrative Procedure Act grant them the right to challenge that denial. The denial presents a risk of harm to their interests as sovereign States in protecting their citizens and property from the potentially catastrophic environmental impacts of the spent-fuel pools at the nuclear power plants within or close to their borders. That risk of harm would be reduced if NRC determines that spent-fuel pools have significant environmental impacts and requires the operators of nuclear power plants to mitigate those impacts. These interests are sufficient to

confer standing on the States. *See Massachusetts v. EPA*, 549 U.S. 497, 520-26 (2007).

ISSUE PRESENTED FOR REVIEW

Should NRC reconsider its 1996 finding that spent-fuel pools have no significant environmental impacts when (1) NRC now relies on site-specific mitigation measures, but nonetheless refuses to consider environmental impacts on a site-specific basis; (2) new information since 1996 demonstrates the real possibility of leaks, accidents, or terrorist attacks involving the pools; and (3) NRC relied primarily on a study that was not publicly available in denying the petitions for rulemaking?

STATEMENT OF THE CASE

A. Statutory Framework

1. The Atomic Energy Act

The Atomic Energy Act, 42 U.S.C. § 2011 *et seq.*, charges NRC with ensuring that the generation and transmission of nuclear power “will provide adequate protection to the health and safety of the public.” 42 U.S.C. § 2232(a); *see also id.* § 2133(b). NRC acknowledges that public safety should be “the first, last, and a permanent consideration in

any decision on the issuance of a construction permit or a license to operate a nuclear facility.” *See Power Reactor Dev. Corp. v. Int’l Union of Elec. Radio & Mach. Workers*, 367 U.S. 396, 402 (1961).

NRC may issue a license to operate a nuclear power plant for a period of up to forty years and renew it upon the expiration of that period. 42 U.S.C. § 2133(b), (c); 10 C.F.R. pt. 54. When NRC issues or renews a license, it is required to “grant a hearing upon the request of any person whose interest may be affected by the proceeding.” 42 U.S.C. § 2239(a)(1)(A). It is also required to grant a hearing to any person whose interest is affected by the issuance or modification of a regulation. *Id.*

2. The National Environmental Policy Act

The National Environmental Policy Act (“NEPA”) requires every federal agency to examine the environmental impacts of its decisions and to inform the public that it has considered environmental concerns in its decision-making. *Balt. Gas & Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983). NEPA requires federal agencies to prepare an environmental impact statement for all major federal actions

significantly affecting the environment. 42 U.S.C. § 4332(2)(C). An EIS must discuss, among other things, the significant environmental impacts of the proposed action and alternatives to the proposed action. *Id.*

The President's Council on Environmental Quality has promulgated regulations implementing NEPA. 40 C.F.R. § 1500.1 *et seq.* Those regulations provide that the environmental impacts examined by an EIS must include "[i]ndirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." *Id.* § 1508.8(b). "Reasonably foreseeable" effects include "impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." *Id.* § 1502.22(b)(4).

The regulations also provide that, after an agency prepares a draft EIS, it must solicit comments from, among others, state environmental agencies and the public. *Id.* § 1503.1. A final EIS must respond to those comments. *Id.* § 1502.9(b).

Agencies must supplement a previously issued EIS when “[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.” *Id.*; see also *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 374 (1989).

NRC’s predecessor, the Atomic Energy Commission, initially opposed the application of NEPA to its decisions. But in 1971, the United States Court of Appeals for the District of Columbia rejected AEC’s arguments and ruled that the Commission must evaluate its actions and decisions in accordance with NEPA. *Calvert Cliffs Coordinating Comm. v. U.S. Atomic Energy Comm’n*, 449 F.2d 1109 (D.C. Cir. 1971).

3. The Administrative Procedure Act

Under the Administrative Procedure Act, a court may set aside a final agency decision that is “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.” 5 U.S.C. § 706(2). An agency’s denial of a petition for rulemaking should be set aside as arbitrary and capricious if it is not “reasoned.” *Massachusetts v. EPA*,

549 U.S. at 533-34; *Am. Horse Protection Ass'n v. Lyng*, 812 F.2d 1, 5 (D.C. Cir. 1987).

B. Spent-fuel Storage

1. Spent-fuel storage pools

After nuclear fuel is used in reactors to generate energy, the spent fuel remains extremely hot and radioactive. Joint Appendix (“J.A.”) 979-980. To protect workers, facilities, and neighboring communities, all of the nuclear power plants across the country have constructed large swimming-pool-like structures in which assemblies containing zirconium rods or “cladding” holding spent-fuel pellets are stored on racks submerged in water. J.A. 976-980; 1000-1003; *see also Massachusetts v. United States*, 522 F.3d 115, 122 (1st Cir. 2008). Because the fuel is hot and radioactive when placed in the pools, cooler water is continuously added to the pools to prevent the water from boiling and to buffer the radiation. If the water boils or drains away, the zirconium cladding that holds the spent-fuel pellets may melt or catch on fire, potentially causing a major release of radiation. J.A. 998-1000; *see also* J.A. 769-770, 844-855.

Spent-fuel pools have different designs and liners, and some are located at ground level while others are located above the ground. The design and placement of spent-fuel racks, air circulation and convection mechanisms, type of reactor, and amount of heat generated by the fuel itself also differ from plant to plant. But the pools share one common feature: all are located outside the protective containment shells that surround nuclear power reactors. J.A. 1000. The pools are susceptible to fire and radiological release from a wide range of conditions, including intentional attacks, and their susceptibility is affected by the differences between the pools. J.A. 968, 991, 1000-1003.

Spent-fuel pools were never intended to serve as medium- or long-term storage facilities for radioactive fuel. J.A. 775, 980-981. Rather, the United States government and the nuclear energy industry expected to dispose of spent fuel at a national nuclear waste disposal facility at Yucca Mountain in Nevada that was initially to open in 1998. *See Massachusetts v. United States*, 522 F.3d at 122; *Entergy Nuclear Indian Point 2, LLC v. United States*, 64 Fed. Cl. 515, 517 (2005). But construction has not begun on the Yucca Mountain facility, nor has NRC even issued a permit for it. NRC indicated recently that a long-term

repository may not be available until 2025 or later. 73 Fed. Reg. 59,551, 59,553 (Oct. 9, 2008).

As a result, in the 1970s, NRC authorized reactor owners to increase the amount of fuel stored in spent-fuel pools, a practice known as “dense packing” or “reracking”. *See id.*; 40 Fed. Reg. 42,801, 42,802 (Sept. 16, 1975); J.A. 775, 983, 1003. Today, each spent-fuel pool contains a greater volume of radioactive material than does its associated nuclear reactor, J.A. 766, 1229, 1256-1258, and it is likely that spent nuclear fuel will be stored in these pools for years to come.¹

¹ As a result of the delays in opening the Yucca Mountain facility, NRC has approved the interim storage of spent fuel in dry casks but the standard practice is to move the spent fuel to dry casks for passive cooling only after it has cooled in a pool for at least five years. J.A. 980, 984. Like the pools, dry-cask storage facilities are located outside the containment shells that surround nuclear reactors. Although dry-cask storage would allow lower-density racking in spent-fuel pools and thereby significantly reduce the risks of a fuel fire and release of radioactive materials posed by dense storage in pools, the nuclear industry objected to the accelerated transfer of a large portion of current spent-fuel inventories to dry casks on the basis of cost. J.A. 1649, 1652. Under NRC and industry’s preferred option, significant inventories of spent fuel that could be stored in dry casks – and thereby reduce the risk of fire – will remain in spent fuel pools well into the future.

2. NRC's 1996 generic EIS and regulations regarding spent-fuel pools

NRC has promulgated regulations implementing NEPA. 10 C.F.R. § 51.10 *et seq.* Those regulations provide that the renewal of a nuclear power plant's license requires an environmental impact statement. *Id.* § 51.20(b)(2). They also require NRC to supplement an EIS when new and significant information is available regarding the environmental impact of its actions, particularly in the context of license renewals. 10 C.F.R. §§ 51.92(a)(2), 51.95(c)(3).

In 1996, NRC issued a "generic" EIS regarding the environmental impacts of license renewals. J.A. 150-198. The generic EIS, and the regulations NRC issued based on it, create two categories of issues arising from license renewals: Category 1 issues that do not vary from plant to plant and for which the environmental analysis in the generic EIS is considered sufficient, and Category 2 issues that require plant-specific analysis and are addressed in a supplemental EIS when a plant's license is renewed. J.A. 191-192, 228; *see also Massachusetts v. United States*, 522 F.3d at 119-20.

The generic EIS classified the storage of spent fuel in pools as Category 1 matter and found that "[t]he continued storage of existing

spent fuel and storage of spent fuel generated during the license renewal period can be accomplished safely and without significant environmental impacts” and that “the environmental impacts will be small for each plant.” J.A. 191-192. It also found that no additional mitigation measures would be required to reduce these impacts. J.A. 192. The generic EIS did not discuss the potential for terrorist attacks or sabotage on spent-fuel storage facilities, nor did it discuss the potential for spent-fuel pool leaks to contaminate nearby groundwater and surface waters. J.A. 176-198.

Based on the generic EIS, NRC promulgated a regulation providing that “[t]he Commission has made a generic determination that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the license life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin.” 10 C.F.R. § 51.23(a). NRC also issued a regulation providing that, when it issues a plant-specific supplemental EIS in connection with the renewal of a license, the supplemental EIS is not required to consider the environmental impacts of the plant’s spent-fuel pools. *Id.*

§§ 51.53(c)(2), 51.95(c)(2), Part 51, Subpart A, App. B, Table B-1. As a result, neither the plant nor NRC addresses those potential impacts during a plant's license renewal process, and NRC has denied the States and the public a hearing regarding the impacts.

3. The spent-fuel pools at Indian Point

The spent-fuel pools serving the reactors at Indian Point are of particular concern to New York and Connecticut. Indian Point is twenty-four miles north of New York City, near the city's reservoirs and water-supply resources for Connecticut, as well as in the most densely populated area in the United States. More than seventeen million people in Pennsylvania, New Jersey, Connecticut, and New York live, work, or travel within fifty miles of Indian Point. Indeed, the fifty-mile Emergency Planning Zone around Indian Point contains the highest population of any nuclear power reactor site in the nation. Under NRC's current siting regulations, which were not in place when AEC approved the site in 1956, it is highly unlikely that the Indian Point reactors could be located today in this densely populated area. *See* 10 C.F.R. § 100.21(h).

Two of the planes hijacked on September 11, 2001 flew near or over Indian Point. J.A. 897. The 9/11 Commission's report revealed that Khalid Sheikh Mohammad, the mastermind of the 9/11 attacks, originally planned to hijack additional aircraft to crash into targets on both coasts, including nuclear power plants. J.A. 901. As late as July 2001, the terrorists were considering attacking a specific nuclear facility in New York, which one of the pilots "had seen during familiarization flights near New York." J.A. 905. This facility was most likely Indian Point.

Two of Indian Point's three nuclear reactors remain in operation and have spent-fuel pools that contain large quantities of highly radioactive material. J.A. 767. A third pool, which served a reactor that was shut down in 1974, contained radioactive spent fuel until late 2008.

4. License renewals

The licenses for several nuclear reactors within or close to the borders of Massachusetts, Connecticut and New York will expire in the next several years. The operating licenses for the Pilgrim plant in Massachusetts and the Vermont Yankee plant in Vermont will expire in

2012. Indian Point's licenses for its two operational reactors expire in 2013 and 2015.

In 2006, in the license renewal proceedings for the Pilgrim and Vermont Yankee plants, Massachusetts requested that the plant operators be required to address significant new information — the same information that Massachusetts submitted to NRC in its subsequent petition for rulemaking — about the environmental impacts of operating the spent-fuel pools at the plants for an additional twenty years, and NRC revisit the conclusion in the 1996 generic EIS that spent-fuel pools have no significant environmental impacts. J.A. 1126-1187, 1212-1337. The Atomic Safety Licensing Boards convened to hear those license renewals denied the requests based on NRC's regulation precluding analysis of the impacts of spent-fuel storage in license renewal proceedings. *Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc.*, Docket No. 50-293-LR; ASLBP No. 06-848-02-LR; LBP-06-23 (Pilgrim Nuclear Power Station), Memorandum and Order (Oct. 16, 2006); *In the Matter of Entergy Nuclear Vermont Yankee, LLC, & Entergy Nuclear Operations, Inc.*, Docket No. 50-271-LR; ASLBP No. 06-849-03-LR; LBP-06-20 (Vermont Yankee Nuclear Power Station),

Memorandum and Order (Sept. 22, 2006). Pilgrim's license renewal was granted by the board convened to hear that proceeding and is on appeal to NRC. Vermont Yankee's remains before its board.

New York and Connecticut attempted to raise similar contentions regarding spent-fuel pools in the Indian Point license renewal proceeding but their contentions were also rejected by an Atomic Safety Licensing Board. *In the Matter of Entergy Nuclear Operations, Inc.*, Docket Nos. 50-247-LR & 50-286-LR, ASLBP No. 07-858-03-LR-BD01 (Indian Point Units 2 and 3), Memorandum and Order (July 31, 2008). A hearing is expected to be held in 2010 on several other issues.

C. Petitions for Rulemaking

NRC's regulations authorize interested persons to file a petition seeking to amend or rescind its regulations. 10 C.F.R. § 2.802(a). In 2006 and 2007, respectively, Massachusetts and California submitted petitions for rulemaking asking NRC to reconsider its 1996 finding that the environmental impacts of spent-fuel storage pools are insignificant and to require that the plant-specific supplemental EISs for license renewals address those impacts. J.A. 1100-1337, 1622-1636. The States

provided evidence that the conclusion in the 1996 generic EIS that spent-fuel storage pools have no significant environmental impacts is no longer correct. New York supported both petitions and submitted additional evidence, including evidence regarding leaks of radioactive water from spent-fuel pools at several reactors around the country since NRC issued the 1996 generic EIS. J.A. 1639-1641, 1725-1732. Connecticut submitted a joint letter with other States in support of Massachusetts's petition. J.A. 1639-1641.

1. Leaks from spent-fuel pools

In 2005, the Indian Point operator identified leakage of radionuclide-contaminated water from cracks in two different spent-fuel pools and subsequently discovered tritium, strontium, and other radionuclides in groundwater underneath the site. J.A. 1076-1077, 1094-1095. Tritium and strontium from Indian Point's spent-fuel pools have reached the Hudson River. J.A. 1094-1095, 1690. In 2002, water from a spent-fuel pool at Salem Nuclear Power Plant in New Jersey was discovered to have leaked into a narrow seismic gap between two buildings, and further investigation revealed tritium in the groundwater

near one of the buildings. J.A. 856-859. These leaks occurred during the reactors' initial licensing term, calling into question the structural integrity of spent-fuel pools as many reactors approach the end of their initial terms and seek license renewals.

In 1997, groundwater samples taken by Brookhaven National Laboratories staff revealed concentrations of tritium twice the allowable federal drinking-water standards. J.A. 248-257. Subsequent samples were found to contain thirty-two times the standard. J.A. 252. The tritium was leaking from the spent-fuel pool serving the laboratory's nuclear reactor into the aquifer that provides the sole source of drinking water for nearby Suffolk County residents. J.A. 255-257; 43 Fed. Reg. 26,611, 26,612 (June 21, 1978). The Department of Energy's and laboratory's investigations concluded that the tritium had been leaking for as long as twelve years without the Department's or laboratory's knowledge. J.A. 257. A subsequent federal investigation concluded that Brookhaven employees did not aggressively monitor its spent-fuel pool for leaks — even postponing an agreed-upon monitoring-well system — so that years passed before tritium contamination was discovered in the aquifer near the spent-fuel pool. J.A. 257-260.

NRC recently acknowledged that “leaks can develop in [spent-fuel pools] and go undetected for long periods of time absent appropriate monitoring, resulting in the contamination of onsite groundwater and the potential for undetected, unevaluated releases of radioactivity to an unrestricted area.” J.A. 1096. It also acknowledged that its current regulations do not require groundwater monitoring and that licensees typically initiate groundwater monitoring only in response to known leaks. J.A. 1096-1097. But NRC has not directed plants to monitor for or assess leaks. J.A. 1096-1098.

2. Risk of fire

The evidence submitted by the States also shows that fuel stored in high-density fuel-storage pools is more vulnerable to fire than NRC concluded in its 1996 generic EIS. In 2001, five years after NRC issued that EIS, it issued a technical study called NUREG-1738 that examined the risk posed by a spent-fuel pool zirconium fire. J.A. 355-721. That study found that, if a spent-fuel pool lost enough water to uncover the spent-fuel assemblies, the spent fuel could heat to the point where the fuel’s zirconium cladding might catch fire. J.A. 370-373, 446-451. Such

a zirconium fire could generate a radioactive plume causing thousands of deaths from cancer. J.A. 650-661, 1009-1010. Other studies submitted to NRC reached the same conclusion about the adverse consequences of a zirconium fire. J.A. 766-770, 844-855.

Contrary to the generic treatment of spent-fuel pools in the 1996 EIS, NUREG-1738 also found that “[h]eat removal is very sensitive to” plant-specific factors, including “fuel assembly geometry” and “rack configuration,” and is “subject to unpredictable changes after an earthquake or cask drop that drains the pool.” J.A. 363. It found further that “it was not feasible, without numerous constraints, to establish a generic decay heat level (and therefore a decay time) beyond which a zirconium fire is physically impossible.” J.A. 363. It concluded that, “since a non-negligible decay heat source lasts many years and since configurations ensuring sufficient air flow for cooling cannot be assured, the possibility of reaching the zirconium ignition temperature cannot be precluded on a generic basis.” J.A. 363.

Following the release of NUREG-1738, NRC’s Director of Operations issued a memorandum acknowledging that “a zirconium fire event can have public health and safety consequences similar to a severe

core damage accident with a large offsite release” and “that the possibility of a zirconium fire cannot be dismissed even many years after final reactor shutdown.” J.A. 726, 723. He further acknowledged that NUREG-1738’s findings differed from NRC’s previous understanding that, if the water level in a pool dropped, then the spent fuel would be cooled by air and would never reach fire-ignition temperature. J.A. 723-724. Indeed, he stated that NRC staff had previously believed that “zirconium fire was not possible.” J.A. 729.

A report by NRC staff that was attached to that memorandum warned that sabotage could cause a drop in the level of water in a spent-fuel pool, contrary to the staff’s prior belief that “sabotage could not cause a zirconium fire.” J.A. 743-744. The report indicated that NRC had acknowledged the need to defend against the possibility of sabotage to spent-fuel pools, finding that even though the threat of sabotage could not be quantified, it “is likely in a range that warrants protection against a violent external assault as a matter of prudence.” J.A. 738, 743. The report also suggested a regulatory change that would require a plant-specific review of security measures, thereby recognizing that the

threat to spent-fuel pools could no longer be viewed as a generic issue. J.A. 747-748.

The States also submitted a 2003 peer-reviewed article by Robert Alvarez, a Senior Scholar at Princeton University's Institute for Policy Studies and a former Senior Policy Advisor to the Secretary of Energy, that concluded that the dense packing of spent fuel in cooling pools does not provide a sufficient safety margin in the event of a pool breach and consequent water loss from an accident or terrorist attack. In such cases, the fuel most recently placed in the pool could heat up enough to ignite its zirconium cladding, possibly resulting in the release of large amounts of radioactivity to the environment. J.A. 760-818. To reduce this risk, the Alvarez article recommended moving spent fuel that had cooled for five years to dry-cask storage. J.A. 786. The States also provided a report by Gordon Thompson of the Institute for Resource and Security Studies concluding that increased storage of spent fuel in dry casks would allow lower-density packing of spent-fuel pools and decrease the risk of pool fires. J.A. 1247.

Concerned about the implications of the Alvarez article and NUREG-1738, Congress directed NRC to seek independent technical

advice from the National Academy of Sciences (“NAS”) on the safety and security of spent-fuel storage. J.A. 841. In response, the NAS confirmed the potential for a pool fire that could result in the release of a substantial portion of a fuel pool’s radioactive inventory. J.A. 968. The NAS report also agreed with NUREG-1738 that the risk of spent-fuel pool fires cannot be determined on a generic basis: “[t]he potential vulnerabilities of spent fuel pools to terrorist attacks are plant-design specific. Therefore, specific vulnerabilities can be understood only by examining the characteristics of spent fuel storage at each plant.” J.A. 968. Based on that study, Congress directed NRC to develop site-specific models to assess the risks of spent-fuel storage and the mitigation of those risks. J.A. 917.

3. Risk of terrorist attacks

In the years since 9/11, the federal government has repeatedly acknowledged that there is a credible threat of intentional attacks on nuclear power plants, including the specific threat of an aircraft attack. *See, e.g.*, J.A. 1629-1630. In 2002, NRC itself issued an order requiring nuclear power plants “to develop specific guidance and strategies to

maintain or restore core cooling, containment, and spent fuel pool cooling capabilities using existing or readily available resources (equipment and personnel) that could be effectively implemented under the circumstances associated with loss of large areas of the plant due to explosions or fire, including those that an aircraft impact might create.” See Letter from J. Boska, NRC, to M. Balduzzi, Entergy Nuclear Operations (July 11, 2007), ML071920023.²

In 2003, a United States General Accounting Office report noted that the nation’s commercial nuclear power plants are possible terrorist targets and criticized NRC’s oversight and regulation of nuclear power plant security. J.A. 1631; *see also* GAO, Nuclear Power Plants Have Upgraded Security, but the NRC Needs to Improve Its Process for Revising the Design Basis Threat 1 (2006), *available at* <http://www.gao.gov/new.items/d06555t.pdf>.

In 2005, prompted by concerns regarding the pace and substance of NRC’s response to the threat of terrorist attacks on nuclear power

² NRC uses ML accession numbers for documents in its “Electronic Reading Room.” To find documents, one may use the agency’s search engine known as Agencywide Documents Access and Management System (ADAMS) at www.nrc.gov/reading-rm/adams/web-based.html.

plants, Congress required NRC to revise its “design basis threat” rule — which identifies the types of security threats that a nuclear power plant may face, 10 C.F.R. § 73.1(a), and the means by which a facility owner must be prepared to defeat such threats, *id.* § 73.55 — and, in that rulemaking process, to consider, among other things, “the events of September 11, 2001,” “suicide attacks,” “the potential for water-based and air-based threats,” “the potential use of explosive devices of considerable size,” and “large fires of long duration.”³ 42 U.S.C. § 2210e(b)(1), (5)-(7) & (9).

The NAS also found that successful terrorist attacks on spent-fuel pools are possible and that under some conditions, a terrorist attack that partially or completely drained a spent-fuel pool could lead to a zirconium cladding fire that would “propagate” — *i.e.*, spread from the spent-fuel rod or assembly that initially caught fire to other assemblies — and cause the release of large quantities of radioactive materials to the environment. J.A. 998-999, 1008. The NAS found further that the

³ In petitions for review pending in the Ninth Circuit, New York and others have challenged NRC’s failure to address air-based terrorist attacks in the revised “design basis threat” rule. *See Pub. Citizen, Inc. v. NRC*, Nos. 07-71868, 07-72555 (9th Cir.).

traditional risk analysis applied to industrial accidents — identifying an event, the probability the event will occur, and the consequences if that event were to occur — could not be applied to the risk of a terrorist attack because this risk depends on “impossible-to-quantify factors such as terrorist motivations, expertise, and access to technical means.” J.A. 986. It recommended additional analyses to understand the events that could lead to zirconium fires. J.A. 1018-1019.

D. NRC’s Decision

In a decision issued August 1, 2008, NRC, over the dissent of one of its Commissioners, rejected Massachusetts’s and California’s rulemaking petitions and, as a result, denied them a hearing on their claims regarding the environmental impacts of spent-fuel pools. Special Appendix (“SPA”) 1-39; *see also* J.A. 1752-1761. NRC recognized that spent-fuel pools “contain[] a potentially large inventory of radionuclides and that a release of that material could have adverse effects.” SPA 24. It also recognized that two of its own studies — NUREG-1353, issued in 1989, and NUREG-1738, issued in 2001 — found a risk of a fire in a spent-fuel pool. SPA 16-17. But NRC nonetheless concluded that the

risk of a fire was “very low” and that, as a result, the environmental impacts of such a fire were not significant. SPA 16-19.

NRC’s decision relied on recently implemented “mitigation measures” that would decrease the risk of a spent-fuel pool fire, but the only specific mitigation measure it discussed was a “coolant makeup and spray capability system” that would cool spent fuel in the event of a drop in the water level of a pool. SPA 22. It also stated that, “in cases where [spent fuel pool] water levels can not be maintained, leakage control strategies would be considered.” SPA 22. NRC indicated that it has issued license amendments and safety evaluations incorporating these strategies into all operating nuclear power plants, but the decision does not discuss the effectiveness of those measures or even the extent to which they are actually in use at plants.⁴ SPA 22.

NRC also found, based on a 2006 report issued by Sandia National Laboratories, that spent-fuel pools were unlikely to catch fire for two reasons: first, spent fuel cools more quickly than realized in 1996 as a

⁴ Despite the evidence submitted by the States showing that increased dry-cask storage would allow lower-density racking in spent-fuel pools and thereby reduce the risk of fires in pools, NRC’s discussion of mitigation measures did not mention that measure. See J.A. 786 (Alvarez article), 1247 (Thompson report), 1028-1031 (NAS report).

result of heat transferring from newer, hotter fuel to older, cooler fuel; and second, measures to prevent a fire could be taken during the time period between the drop in the water level of a pool and the onset of a fire. SPA 18. NRC did not disclose or release the 2006 Sandia report until after it issued its decision — and then only with significant redactions — and thus the States did not have an opportunity to comment on it in connection with the rulemaking petitions. SPA 17; *see also* J.A. 1373-1492.

With respect to the environmental impacts of terrorist attacks on spent-fuel pools, NRC stated that in its view “an analysis of the environmental impacts of a hypothetical terrorist attack on an NRC-licensed facility is not required under NEPA.” SPA 30. NRC also found that the risk of a zirconium fire as a result of a terrorist attack was “remote and speculative” based on the mitigation measures it had already described as well as security measures implemented since 9/11, including emergency-preparedness efforts, training, vehicle barriers, fences, intrusion detection systems, and armed responders. SPA 13-15, 33.

NRC's decision did not address the risks to the environment of leaks from spent-fuel pools.

STANDARD OF REVIEW

Although judicial review of an agency's refusal to initiate rulemaking proceedings is "highly deferential," an agency's rejection of a petition for rulemaking may be overturned as "arbitrary and capricious" if it is not "reasoned." *Massachusetts v. EPA*, 549 U.S. at 533-34; *see also Am. Horse Protection Ass'n*, 812 F.2d at 5. A reviewing court must assure itself that the agency considered the relevant factors, that it explained the facts and policy concerns on which it relied, and that the facts have some basis in the record. *Id.*

Further, a court will not lightly uphold agency refusals to initiate rulemaking in the face of new information. "[C]hanges in factual and legal circumstances may impose upon the agency an obligation to reconsider a settled policy or explain its failure to do so." *Bechtel v. FCC*, 957 F.2d 873, 881 (D.C. Cir. 1992). Thus, "an agency may be forced by a reviewing court to institute rulemaking proceedings if a significant factual predicate of a prior decision on the subject (either to

promulgate or not to promulgate specific rules) has been removed.” *Am. Horse Protection Ass'n*, 812 F.2d at 5 (citation and internal quotation marks omitted).

SUMMARY OF ARGUMENT

This Court should reverse NRC’s denial of the rulemaking petitions asking it to reconsider its 1996 generic determination that spent-fuel pools do not have significant environmental impacts. NRC’s refusal to reconsider was arbitrary and capricious because it was based on plant-specific mitigation and security measures, in direct contradiction to its 1996 determination that those impacts could be examined on a generic basis and without any consideration of future mitigation measures. NRC’s denial was also contrary to the mandates of NEPA because it precludes full consideration of the plant-specific variables that affect the risk of spent-fuel pool fires and prevents the States and the public from receiving information about those variables and commenting on them.

The decision further violates NEPA because the new information submitted by the States showed that spent-fuel pool leaks and fires

create a risk of significant environmental impacts that is not remote and speculative. NEPA prohibits NRC from dismissing the risk of a spent-fuel pool fire based on mitigation measures absent substantial evidence that those measures are effective and have been fully implemented at nuclear power plants. NRC's decision was also based primarily on a report that it failed to make available to the States for their review and comment before issuing the decision. And the decision failed even to address the environmental impacts of leaks from spent-fuel pools.

NEPA also requires NRC to consider the environmental impacts of a terrorist attack because NRC's own actions make it clear that the risk of such an attack is neither remote nor speculative. Even though it would not be responsible for an attack, NRC has the authority to require nuclear power plants to mitigate the impacts of an attack.

ARGUMENT

NRC SHOULD RECONSIDER ITS 1996 FINDING THAT SPENT-FUEL POOLS HAVE NO SIGNIFICANT ENVIRONMENTAL IMPACTS

A. NRC's Reliance on Plant-Specific Measures to Support a Generic Determination Was Arbitrary and Capricious.

In 1996, NRC found that the environmental impacts of spent-fuel pools could be considered generically. The 1996 generic EIS, and the regulations based on that EIS, found that those impacts were not significant and designated them as Category 1 generic impacts on the ground that they did not require consideration of any plant-specific measures and would not be affected by any future mitigation measures. J.A. 191-192. As a result, NRC does not consider those impacts in a plant-specific supplemental EIS when a plant's license is renewed. 10 C.F.R. § 51.53(c)(2).

But when the States asked NRC to reconsider its conclusion that the pools have no significant impacts, NRC relied on the existence of plant-specific measures. NRC cannot have it both ways: if, as NRC contends, measures that are plant-specific and were adopted since 1996 affect the environmental impacts of spent-fuel pools, then the impacts of spent-fuel pools should be treated as Category 2 plant-specific impacts

and addressed in plant-specific EISs. NRC's reliance on post-1996 plant-specific measures to refuse to reconsider its 1996 determination that the impacts of spent-fuel pools are generic is therefore arbitrary and capricious. *See Huntington Hosp. v. Thompson*, 319 F.3d 74, 79 (2d Cir. 2002).

NRC's administrative rulings confirm that it is treating the impacts of spent-fuel pools inconsistently. In *Massachusetts v. United States*, Massachusetts argued that NRC was required to consider new information regarding the environmental impacts of spent-fuel pools in proceedings to renew the licenses for the Pilgrim and Vermont Yankee nuclear power plants. 522 F.3d at 122-23. The First Circuit accepted NRC's claim that it was not required to consider that information in plant-specific license renewal proceedings, because the environmental impacts of spent-fuel pools are covered by NRC's 1996 generic EIS and regulations. *Id.* at 126-27. NRC argued, and the court agreed, that Massachusetts could challenge the generic EIS, and the regulations based on it, in a petition for a generic rulemaking. *Id.* at 127.

But after avoiding a plant-specific environmental analysis of spent-fuel pools in the Pilgrim and Vermont Yankee licensing proceedings,

NRC then relied on plant-specific security and mitigation measures to deny the States' request to modify the generic EIS and regulations. The security measures — *e.g.*, vehicle barriers, fences, and intrusion detection systems — and mitigation measures — coolant makeup and spray capability systems and leakage control strategies — on which NRC relied to deny the rulemaking petitions are necessarily plant-specific. Moreover, both NRC staff, in NUREG-1738, and the NAS found that the risk of a spent-fuel pool fire depends on plant-specific design factors, such as the configuration of the storage racks in a pool, and cannot be assessed on a generic basis. J.A. 363, 370-373, 446-451, 968, 991.

If, as NRC found in its decision here and NRC staff and the NAS have also found, plant-specific mitigation and security measures are relevant to the environmental impacts of spent-fuel pools, then those impacts are a Category 2 issue requiring analysis on a plant-specific basis when a plant's license is renewed. NRC's reliance on those plant-specific measures to deny the States' petitions is contrary to its own determination that the environmental impacts of spent-fuel pools are generic. It is also contrary to its determination in 1996 that those

impacts would not be affected by any future mitigation measures. Indeed, by taking into account plant-specific measures, NRC has effectively revised its regulations — without the rulemaking process required by the Administrative Procedure Act, 5 U.S.C. § 553 — and re-designated the impacts as Category 2.

NRC's determination that it can continue to treat the environmental impacts of spent-fuel pools as generic even though it admits that those impacts are affected by plant-specific issues precludes full consideration of those impacts, in violation of NEPA. For example, under NRC's reasoning, it will never have to consider the effectiveness of a particular plant's coolant makeup and spray capability system in preventing spent-fuel pool fires at that plant, even though NRC relied on that mitigation measure to make its generic no-impact determination. Where, as here, NRC's generic process does not resolve plant-specific concerns, NEPA requires it to consider those concerns in a plant-specific proceeding. *See Minnesota v. NRC*, 602 F.2d 412, 418 (D.C. Cir. 1979) (“The question is whether there has been an NRC disposition in generic proceedings that is adequate to dispose of the objections to the licensing amendments”).

NRC's determination also prevents the public and other governmental bodies from receiving information about the plant-specific matters — design issues and security and mitigation measures — that affect the risk of fires in spent-fuel pools. That is contrary to NEPA's core purpose of ensuring that relevant information about the environmental consequences of an agency's action is made available to other governmental bodies and the public. *See Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989); *see also Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 768-69 (2004); *Balt. Gas & Elec. Co.*, 462 U.S. at 97. It also conflicts with NEPA's goal of giving other government agencies "adequate notice of the expected consequences [of an agency's action] and the opportunity to plan and implement corrective measures in a timely manner." *See Robertson*, 490 U.S. at 350. The one-sided process employed by NRC precludes the States — which NRC expects to play a large role in responding to the environmental impacts of a spent-fuel pool fire — from meaningful participation in identifying and exploring those impacts. And it denies the States and the public the right to a hearing on those matters when a

plant's license is renewed, in violation of the Atomic Energy Act. 42 U.S.C. § 2239(a)(1)(A).

In short, in light of NRC's own recognition that the risk of spent-fuel fires is affected by plant-specific issues and by measures that it has taken since it issued its 1996 generic EIS, NRC should have granted the States' petitions for rulemaking and reconsidered its 1996 generic determination that spent-fuel pools have no significant environmental impacts.

B. New Information Showed That Spent-Fuel Pools Have Significant Environmental Impacts That NEPA Requires NRC to Examine.

NRC also should have granted the rulemaking petition because the new information the States submitted cast doubt on the 1996 no-impact finding. NEPA requires federal agencies to consider the reasonably foreseeable environmental impacts of their actions, including even low-probability impacts if they would have catastrophic consequences. 40 C.F.R. §§ 1502.22(b), 1508.8(b). Even where an agency believes the environmental impacts of a proposed action are insignificant, an EIS may be required where “[t]he degree to which the possible effects on the

human environment are highly uncertain or involve unique or unknown risks.” *Found. on Econ. Trends v. Heckler*, 756 F.2d 143, 155 (D.C. Cir. 1985) (quoting 40 C.F.R. § 1508.27(b)(5)); *see also Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1213 (9th Cir. 1998).

An agency is excused from considering an impact only if its probability is so low that it is remote and speculative. *Limerick Ecology Action, Inc. v. United States NRC*, 869 F.2d 719, 739 (3d Cir. 1989); *City of N.Y. v. United States Dep’t of Transp.*, 715 F.2d 732, 752 (2d Cir. 1983). “When the determination that a significant impact will or will not result from the proposed action is a close call, an EIS should be prepared.” *Nat’l Audubon Soc’y v. Hoffman*, 132 F.3d 7, 13 (2d Cir. 1997) (citations omitted). NEPA also requires an agency to reconsider the environmental impacts of an action if the agency receives new and significant information showing that that its prior analysis was incorrect. 40 C.F.R. § 1502.9(c)(1)(ii); 10 C.F.R. §§ 51.92(a), 51.95(c)(3); *see also Marsh*, 490 U.S. at 374.

NRC does not dispute that a release of radioactive materials from a spent-fuel pool could have catastrophic consequences. Because the new information the States submitted to NRC showed that the risk of

such a release as a result of leaks, fires, and terrorist attacks is neither remote nor speculative, NRC was required to grant the rulemaking petitions and reconsider the conclusion in its 1996 generic EIS, and the regulations based on that EIS, that spent-fuel pools have no significant environmental impacts.

Since 1996, several spent-fuel pools have leaked radioactive materials into groundwater and the subsurface, creating a risk of harm to the environment that is neither remote nor speculative. NRC's decision fails entirely to address that risk and should be reversed for that reason alone.

The information submitted by the States also demonstrated the risk that, if the water level in a spent-fuel pool accidentally drops below the top of the fuel, the zirconium rods or cladding containing the spent-fuel pellets will catch fire. NRC found that that risk was very low based on (1) mitigation measures and (2) the conclusions in the Sandia report that newer, hotter fuel will transfer its heat to older, cooler fuel and that the time between the drop in the level of water and onset of a fire will allow for preventive action. Neither of these is an adequate response to the States' new information.

First, NEPA allows an agency to rely on mitigation measures to make a finding that an action would have no significant environmental impacts only “[w]hen the adequacy of [the] proposed mitigation measures is supported by substantial evidence.” *Nat’l Audubon Soc’y*, 132 F.3d at 17. In *National Audubon Society*, this Court held that the Forest Service could not, in finding that the extension of a road would not have significant impacts, rely on untested mitigation measures. *Id.*

There is no evidence, much less substantial evidence, that the mitigation measures on which NRC relies — coolant makeup and spray capability systems and leakage control strategies — have been fully implemented at all nuclear power plants and are effective to prevent fires in the event of a drop in the water level of a spent-fuel pool. In the absence of such evidence, NRC cannot rely on those measures to find that the risk of a fire is so low that it does not have to consider a fire’s environmental impacts.

In any event, even if NRC could rely on these mitigation measures, NRC’s decision did not find that the risk of a spent-fuel fire was so low that it was remote and speculative. *See* SPA 16-19. In the absence of a finding by NRC that a spent-fuel pool fire caused by accident is remote

and speculative, NEPA requires NRC to consider the environmental impacts of such a fire when it relicenses nuclear power plants.

Second, NRC waited to make the final Sandia report public — and then only with significant redactions — until after it issued its decision denying the States' rulemaking petitions. As a result, the States were deprived of any opportunity to evaluate and comment on the findings made in the report regarding heat transfer from newer to older fuel and the time between the drop in a pool's water level and onset of a fire. They were also deprived of the opportunity to comment on other aspects of the report, including information indicating, contrary to NRC's 1996 determination that it can assess the risk of a spent-fuel pool fire generically, that several plant-specific variables — the design and placement of pools and spent-fuel racks, storage configuration, air circulation and convection mechanisms, use and design of the fuel itself, and fuel age — can affect the time it takes for spent fuel to ignite. J.A. 1379, 1402-1405, 1426, 1434. NRC cannot rely on that report absent an opportunity for the States to review and comment on it. *See Nat'l Black Media Coalition v. FCC*, 791 F.2d 1016, 1024 (2d Cir. 1986). Moreover, because NRC's regulations establish means for providing security-

related information to States, NRC should have made the Sandia report in its entirety available to the States before issuing its decision. *See* 10 C.F.R. §§ 2.905, 73.21; see also 42 U.S.C. § 2231 (requiring NRC to allow for public participation on matters involving protected information with the “minimum impairment” of procedural rights).

C. NEPA Requires NRC to Consider the Possibility of Terrorist Attacks on Spent-Fuel Pools.

NRC offered two reasons for refusing to consider the possibility of terrorist attacks on spent-fuel pools, but neither withstands scrutiny. First, NRC found that the probability that a terrorist attack will cause a fire and release radioactive materials is remote and speculative. SPA 33. But NRC did not find that the possibility of an accidental zirconium fire is remote and speculative, and the information submitted by the States showed that the probability of an intentional fire is *higher* than the probability of an accidental fire. *See* J.A. 1246, 1272, 1758. Although NRC criticized the accuracy of the numerical estimates provided by the States, it did not identify any evidence that an intentional fire is less probable than an accidental fire. *See* SPA 25.

Moreover, NRC itself recognizes that a terrorist attack could lead to “loss of large areas of the plant due to explosions or fire,” which could disable the mitigation measures that may be available in the event of an accidental fire. See Letter from J. Boska, NRC, to M. Balduzzi, Entergy Nuclear Operations (July 11, 2007), ML071920023; *see also* J.A. 1015. And NRC’s NUREG-1738 study found that aircraft damage could affect the structural integrity of spent-fuel pools and the availability of nearby support systems and cause a drop in the level of the water in a pool sufficient to uncover the fuel. J.A. 395. Because the risk of a zirconium fire as a result of a terrorist attack is no less probable than the risk of an accidental fire, NRC is required to consider the environmental impacts of a terrorist attack on a spent-fuel pool when it renews a nuclear power plant’s license.

Second, NRC stated that it does not need to consider the environmental impacts of a terrorist attack when it renews a license because the renewal “would not be the ‘proximate’ cause of a terrorist attack.” SPA 33. NRC’s “proximate cause” analysis was based on a misreading of *Metropolitan Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766 (1983).

At issue in *Metropolitan Edison* was whether NEPA required NRC to consider the psychological impact of reopening the Three Mile Island nuclear reactor on the people who lived in the vicinity of the reactor. The Court explained that NEPA required “a reasonably close causal relationship” between an agency’s action and an environmental impact and that that causal relationship was “like the familiar doctrine of proximate cause from tort law.” *Id.* at 774. The Court held that causal relationship was not present where the psychological damage to those who lived in the vicinity would flow not from an accident itself but from the “*risk* of an accident,” which “is not an effect on the physical environment.” *Id.* at 775 (emphasis in original). The Court expressly limited its holding to the “effects caused by the risk of an accident” rather than “[t]he situation where an agency is asked to consider effects that will occur if a risk is realized, for example, if an accident occurs.” *Id.* at 775 n.9.

In *Department of Transportation v. Public Citizen*, the Court further explained the causal relationship between an agency’s action and the environmental effects NEPA requires the agency to consider. The issue there was whether NEPA required the Department of

Transportation, in promulgating a rule regarding safety requirements for Mexican trucks operating in the United States, to consider the environmental impact of more Mexican trucks entering the United States. *Id.* at 761. The Court held that DOT was not required to consider that impact because DOT had no authority to prevent trucks from entering the United States and therefore “no authority to prevent the effect” of those trucks. *Id.* at 767. The Court also emphasized that requiring DOT to consider those effects would not advance NEPA’s purposes because DOT “lack[ed] the power to act on whatever information might be contained in the EIS.” *Id.* at 768.

Because the impacts of a terrorist attack at issue here are physical effects on the environment, rather than the psychological effects solely of a risk at issue in *Metropolitan Edison*, and because, in contrast to *Department of Transportation v. Public Citizen*, NRC has authority to require nuclear power plants to take measures to prevent or mitigate those impacts, NRC is required to consider them unless they are remote and speculative. Indeed, both the Department of Energy and the Federal Energy Regulatory Commission consider the risk of intentional destructive acts in their EISs. *See* J.A. 1495, 1507-1531.

In *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016, 1029-30 (9th Cir. 2006), the court rejected arguments identical to those NRC presents here. NRC argued that it was not required to consider the impacts of a terrorist attack in a licensing proceeding regarding a facility for storing spent fuel in dry casks because (1) under *Metropolitan Edison*, the license would not be the proximate cause of those impacts; and (2) the impacts were remote and speculative. The court rejected NRC's first argument on the ground that the proximate-cause requirement of *Metropolitan Edison* was confined to the effects caused by the risk of an accident, rather than an accident itself. *Id.* at 1029. And it rejected the second argument because NRC's "efforts and expenditures to combat" terrorist attacks on nuclear power plants belied its claim that an attack was remote and speculative. *Id.* at 1030.

Here, similarly, NRC claims that the risk of a successful terrorist attack on a spent-fuel pool is remote and speculative, but at the same time claims that it has required plants to take various security and mitigation measures to mitigate the impacts of such an attack. SPA 13-15, 32. Indeed, the Chairman of NRC has touted to Congress the

agency's efforts to thwart terrorist attacks, including attacks on spent-fuel pools:

In 2002, the NRC also initiated a classified program on the capability of nuclear facilities to withstand a terrorist attack. The early focus of that program was on power reactors, including spent-fuel pools, and on dry cask storage/transportation. . . . The NRC again met with power reactor licensees in February 2005 on the NRC's spent-fuel pool mitigation measures. . . . The NRC continues to evaluate power reactor security, including spent fuel security, in force-on-force exercises, which the NRC will carry out at least once every three years at each of the power reactor sites.

J.A. 921-922. As in *San Luis Obispo Mothers for Peace*, NRC cannot “insist on its preparedness and the seriousness with which it is responding” to the risk of a terrorist attack on spent-fuel pools while claiming, for NEPA purposes, that the impacts of a successful attack are too remote and speculative to require consideration. *See* 449 F.3d at 1031; *see also Limerick Ecology Action, Inc.*, 869 F.2d at 740. And Congress’s 2005 instruction to NRC to revise its “design basis threat” rule to consider terrorist threats makes it clear that Congress does not believe that those threats are too remote or speculative to merit attention. *See* 42 U.S.C. § 2210e(b)(1), (5), (6), (7) & (9).

The Third Circuit's contrary conclusion in *New Jersey Department of Environmental Protection v. NRC*, No. 07-2771, 2009 U.S. App. LEXIS 6978, at *29 (3d Cir. Mar. 31, 2009), was based on a flawed understanding of NEPA. Like NRC here, the Third Circuit held that NEPA did not require NRC to analyze the potential environmental effects of a terrorist attack in a proceeding to renew a nuclear power plant's license because the renewal would not be "the proximate cause of environmental harm in a terrorist attack." In reaching that conclusion, the court held that *Metropolitan Edison* excluded from NEPA analysis not only the impacts of a risk itself but any impacts that, under traditional torts analysis, are not proximately caused by agency's action. *Id.* at *15-*16.

But *Metropolitan Edison* expressly limited its reasoning to the effects of a risk itself. 460 U.S. at 775 n.9. It also emphasized that it did "not mean to suggest that any cause-effect relation too attenuated to merit damages in a tort suit would also be too attenuated to merit notice in an EIS," and that a court must look to the underlying policies of NEPA "in order to draw a manageable line between those causal changes that may make an actor responsible for an effect and those that

do not.” 460 U.S. at 774 n.7. The line drawn by the Third Circuit conflicts with the underlying policies of NEPA by relieving NRC of the obligation to provide information about the consequences of a terrorist attack to States and members of the public who would be affected by those consequences.

But even if the Third Circuit were correct that *Metropolitan Edison* limited environmental review under NEPA to those impacts for which an agency would be responsible under a traditional tort analysis, the court ruled incorrectly that traditional tort analysis would exclude consideration of the impact of terrorist attacks. Under tort law, a defendant is responsible for an intervening cause “if it is reasonably foreseeable at the time” of the defendant’s conduct. Dan B. Dobbs, *Law of Torts* 462 (2001). “In that case, the defendant is not relieved of liability merely because some other person or force triggered the injury.” *Id.* The actions NRC has taken to prevent and mitigate the effects of terrorist attacks make it clear that NRC itself recognizes that a terrorist attack on a nuclear power plant is reasonably foreseeable. Thus, even under traditional tort analysis, NRC would be required to consider the environmental impacts of a terrorist attack.

The Third Circuit also reasoned, based on the Supreme Court's decision in *Department of Transportation v. Public Citizen*, that NRC did not have to consider the impacts of a terrorist attack because it had no authority to prevent a terrorist attack. But *Department of Transportation v. Public Citizen* held that a federal agency is not required to consider environmental effects it has no authority to prevent. 541 U.S. at 767. Regardless of the authority NRC may have to prevent a terrorist attack, it has authority to prevent, or at least mitigate, the effects of a terrorist attack on a nuclear power plant.

Indeed, if the Third Circuit were correct, an agency would not have to consider the environmental effects of a rainstorm washing pollutants from a government construction site into a river because it had no authority to prevent the rainstorm. Nor would it have to consider the environmental impacts of an earthquake on a power plant or waste-disposal site. But under the reasoning of *Department of Transportation v. Public Citizen*, the agency would be required to consider those effects so long as it had authority to prevent or mitigate the effects, even though it could not prevent the rainstorm or earthquake itself.

In New Jersey Department of Environmental Protection, the Third Circuit observed that no circuit other than the Ninth Circuit has required a NEPA analysis of the environmental impacts of a terrorist attack, citing, among other decisions, this Court's decision in *City of New York*. 2009 U.S. App. LEXIS 6978, at *30. But *City of New York* held that the Department of Transportation was not required to consider the risk of sabotage in its NEPA analysis of the environmental impacts of trucks carrying spent fuel because sabotage falls within *NRC's* realm of responsibility. 715 F.2d at 750. Thus, *City of New York* does not support the Third Circuit's conclusion that NRC is not required to consider the effects of sabotage. The Third Circuit also apparently did not have occasion to review or consider the information — including the Alvarez article and NAS report — submitted in support of Massachusetts's and California's rulemaking petitions.

In short, because the information the States submitted to NRC showed that the risk of a release of radiation from spent-fuel pools as a result of leaks, fires, and terrorist attacks is neither remote nor speculative, NRC was required to reconsider the determination in its

1996 generic EIS, and the regulations based on it, that spent-fuel pools have no significant environmental impacts.

CONCLUSION

For the reasons stated above, the Court should vacate NRC's denial of Massachusetts's and California's petitions for rulemaking and order NRC to grant the petitions, or, in the alternative, remand to NRC for reconsideration in compliance with NEPA, the Atomic Energy Act, and the Administrative Procedure Act.

Dated: New York, New York
May 5, 2009

Respectfully submitted,

ANDREW M. CUOMO
Attorney General of the
State of New York

By: _____
JOHN J. SIPOS
Assistant Attorney General
The Capitol
Albany, NY 12224
518-402-2251

By: _____
MONICA WAGNER
Assistant Solicitor General
120 Broadway, 25th Floor
New York, NY 10271
212-416-6351

BARBARA D. UNDERWOOD
Solicitor General

BENJAMIN N. GUTMAN
Deputy Solicitor General

JOHN J. SIPOS
Assistant Attorney General

of Counsel

KATHERINE KENNEDY
Special Deputy Attorney General

MONICA WAGNER
Assistant Solicitor General

JANICE A. DEAN
Assistant Attorney General

MARTHA COAKLEY
Attorney General of
The Commonwealth of
Massachusetts

By: _____
MATTHEW BROCK
Assistant Attorney General
Office of the Attorney General
Environmental Protection
Division
One Ashburton Place
Boston, MA 02108
617-727-2200 x 2425

RICHARD BLUMENTHAL
Attorney General of the
State of Connecticut
ROBERT D. SNOOK
Assistant Attorney General
55 Elm Street
Hartford, CT 06141
(860) 808-5020

CERTIFICATE OF COMPLIANCE

Pursuant to Rule 32(a)(7)(C) of the Federal Rules of Appellate Procedure, MONICA WAGNER, Assistant Solicitor General in the Office of the Attorney General of the State of New York, hereby certifies that according to the word count feature of the word processing program used to prepare this brief, the brief contains 10,034 words and complies with the type-volume limitations of Rule 32(a)(7)(B).

MONICA WAGNER

SPECIAL APPENDIX

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[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 51

[Docket No. PRM-51-10]

[NRC-2006-0022]

The Attorney General of Commonwealth of Massachusetts

[Docket No. PRM-51-12]

[NRC-2007-0019]

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.

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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-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.

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-

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:

1, n. 2.

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 website at: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/reducing-hazards-spent-fuel.html>.

- **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.

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).

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

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 "triple" 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?

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

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 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

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 website at: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/reducing-hazards-spent-fuel.html>.

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 conditions, however, it is important to realistically model the heat transfer between high- and low-powered

⁷ NAS Report at 53.

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:

⁸ Two occurrences in 100,000 reactor years.
⁹ One occurrence in 10,000 reactor years.

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

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

- 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.

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).*

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.*

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

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 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

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.

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).

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 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

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

¹⁹ NAS Report at 30.

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.

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).

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 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.

/RA/

Annette L. Vietti-Cook,
Secretary of the Commission.

42 USCS § 4332

§ 4332. Cooperation of agencies; reports; availability of information; recommendations; international and national coordination of efforts

The Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act [42 USCS §§ 4321 et seq.], and (2) all agencies of the Federal Government shall—

(A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making which may have an impact on man's environment;

(B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act [42 USCS §§ 4341 et seq.], which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making along with economic and technical considerations;

(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—

(i) the environmental impact of the proposed action,

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State, and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public as provided by *section 552 of title 5, United States Code*, and shall accompany the proposal through the existing agency review processes;

(D) Any detailed statement required under subparagraph (C) after January 1, 1970, for any major Federal action funded under a program of grants to States shall not be deemed to be legally insufficient solely by reason of having been prepared by a State agency or official, if:

(i) the State agency or official has statewide jurisdiction and has the responsibility for such action,

(ii) the responsible Federal official furnishes guidance and participates in such preparation,

(iii) the responsible Federal official independently evaluates such statement prior to its approval and adoption, and

(iv) after January 1, 1976, the responsible Federal official provides early notification to, and solicits the views of, any other State or any Federal land management entity of any action or any alternative thereto which may have significant impacts upon such State or affected Federal land management entity and, if there is any disagreement on such impacts, prepares a written assessment of such impacts and views for incorporation into such detailed statement.

The procedures in this subparagraph shall not relieve the Federal official of his responsibilities for the scope, objectivity, and content of the entire statement or of any other responsibility under this Act [42 USCS §§ 4321 et seq.]; and further, this subparagraph does not affect the legal sufficiency of statements prepared by State agencies with less than statewide jurisdiction.[.]

(E) study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;

(F) recognize the worldwide and longrange character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment;

(G) make available to States, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment;

(H) initiate and utilize ecological information in the planning and development of resource-oriented projects; and

(I) assist the Council on Environmental Quality established by title II of this Act [42 USCS §§ 4341 et seq.].

10 CFR 51.23

§ 51.23 Temporary storage of spent fuel after cessation of reactor operation--generic determination of no significant environmental impact.

(a) The Commission has made a generic determination that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations. Further, the Commission believes there is reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty-first century, and sufficient repository capacity will be available within 30 years beyond the licensed life for operation of any reactor to dispose of the commercial high-level waste and spent fuel originating in such reactor and generated up to that time.

(b) Accordingly, as provided in §§ 51.30(b), 51.53, 51.61, 51.80(b), 51.95, and 51.97(a), and within the scope of the generic determination in paragraph (a) of this section, no discussion of any environmental impact of spent fuel storage in reactor facility storage pools or independent spent fuel storage installations (ISFSI) for the period following the term of the reactor operating license or amendment, reactor combined license or amendment, or initial ISFSI license or amendment for which application is made, is required in any environmental report, environmental impact statement, environmental assessment, or other analysis prepared in connection with the issuance or amendment of an operating license for a nuclear power reactor under parts 50 and 54 of this chapter, or issuance or amendment of a combined license for a nuclear power reactor under parts 52 and 54 of this chapter, or the issuance of an initial license for storage of spent fuel at an ISFSI, or any amendment thereto.

(c) This section does not alter any requirements to consider the environmental impacts of spent fuel storage during the term of a reactor operating license or combined license, or a license for an ISFSI in a licensing proceeding.

10 CFR 51.53

§ 51.53 Postconstruction environmental reports.

(a) General. Any environmental report prepared under the provisions of this section may incorporate by reference any information contained in a prior environmental report or supplement thereto that relates to the production or utilization facility or site, or any information contained in a final environmental document previously prepared by the NRC staff that relates to the production or utilization facility or site. Documents that may be referenced include, but are not limited to, the final environmental impact statement; supplements to the final environmental impact statement, including supplements prepared at the license renewal stage; NRC staff-prepared final generic environmental impact statements; and environmental assessments and records of decisions prepared in connection with the construction permit, operating license, early site permit, combined license and any license amendment for that facility.

(b) Operating license stage. Each applicant for a license to operate a production or utilization facility covered by § 51.20 shall submit with its application a separate document entitled "Supplement to Applicant's Environmental Report -- Operating License Stage," which will update "Applicant's Environmental Report -- Construction Permit Stage." Unless otherwise required by the Commission, the applicant for an operating license for a nuclear power reactor shall submit this report only in connection with the first licensing action authorizing full-power operation. In this report, the applicant shall discuss the same matters described in §§ 51.45, 51.51, and 51.52, but only to the extent that they differ from those discussed or reflect new information in addition to that discussed in the final environmental impact statement prepared by the Commission in connection with the construction permit. No discussion of need for power, or of alternative energy sources, or of alternative sites for the facility, or of any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b) is required in this report.

(c) Operating license renewal stage. (1) Each applicant for renewal of a license to operate a nuclear power plant under part 54 of this chapter shall submit with its application a separate document entitled "Applicant's Environmental Report -- Operating License Renewal Stage."

(2) The report must contain a description of the proposed action, including the applicant's plans to modify the facility or its administrative control procedures as described in accordance with § 54.21 of this chapter. This report must describe in detail the modifications directly affecting the environment or affecting plant effluents that affect the environment. In addition, the applicant shall discuss in this report the environmental impacts of alternatives and any other matters described in § 51.45. The report is not required to include discussion of need for power or the economic costs and economic benefits of the proposed action or of alternatives to the proposed action except insofar as such costs and benefits are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. The environmental report need not discuss other issues not related to the environmental effects of the proposed action and the alternatives. In addition, the environmental report need not discuss any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b).

(3) For those applicants seeking an initial renewed license and holding an operating license, construction permit, or combined license as of June 30, 1995, the environmental report shall include the information required in paragraph (c)(2) of this section subject to the following conditions and considerations:

(i) The environmental report for the operating license renewal stage is not required to contain analyses of the environmental impacts of the license renewal issues identified as Category 1 issues in Appendix B to subpart A of this part.

(ii) The environmental report must contain analyses of the environmental impacts of the proposed action, including the impacts of refurbishment activities, if any, associated with license renewal and the impacts of operation during the renewal term, for those issues identified as Category 2 issues in Appendix B to subpart A of this part. The required analyses are as follows:

(A) If the applicant's plant utilizes cooling towers or cooling ponds and withdraws make-up water from a river whose annual flow rate is less than 3.15×10^{12} ft³/year (9×10^{10} m³/year), an assessment of the impact of the proposed action on the flow of the river and related impacts on instream and riparian ecological communities must be provided. The applicant shall also provide an assessment of the impacts of the withdrawal of water from the river on alluvial aquifers during low flow.

(B) If the applicant's plant utilizes once-through cooling or cooling pond heat dissipation systems, the applicant shall provide a copy of current Clean Water Act 316(b) determinations and, if necessary, a 316(a) variance in accordance with 40 CFR part 125, or equivalent State permits and supporting documentation. If the applicant can not provide these documents, it shall assess the impact of the proposed action on fish and shellfish resources resulting from heat shock and impingement and entrainment.

(C) If the applicant's plant uses Ranney wells or pumps more than 100 gallons (total onsite) of ground water per minute, an assessment of the impact of the proposed action on ground-water use must be provided.

(D) If the applicant's plant is located at an inland site and utilizes cooling ponds, an assessment of the impact of the proposed action on groundwater quality must be provided.

(E) All license renewal applicants shall assess the impact of refurbishment and other license-renewal-related construction activities on important plant and animal habitats. Additionally, the applicant shall assess the impact of the proposed action on threatened or endangered species in accordance with the Endangered Species Act.

(F) If the applicant's plant is located in or near a nonattainment or maintenance area, an assessment of vehicle exhaust emissions anticipated at the time of peak refurbishment workforce must be provided in accordance with the Clean Air Act as amended.

(G) If the applicant's plant uses a cooling pond, lake, or canal or discharges into a river having an annual average flow rate of less than 3.15×10^{12} ft³/year (9×10^{10} m³/year), an assessment of the impact of the proposed action on public health from thermophilic organisms in the affected water must be provided.

(H) If the applicant's transmission lines that were constructed for the specific purpose of connecting the plant to the transmission system do not meet the recommendations of the National Electric Safety Code for preventing electric shock from induced currents, an assessment of the

impact of the proposed action on the potential shock hazard from the transmission lines must be provided.

(I) An assessment of the impact of the proposed action on housing availability, land-use, and public schools (impacts from refurbishment activities only) within the vicinity of the plant must be provided. Additionally, the applicant shall provide an assessment of the impact of population increases attributable to the proposed project on the public water supply.

(J) All applicants shall assess the impact of highway traffic generated by the proposed project on the level of service of local highways during periods of license renewal refurbishment activities and during the term of the renewed license.

(K) All applicants shall assess whether any historic or archaeological properties will be affected by the proposed project.

(L) If the staff has not previously considered severe accident mitigation alternatives for the applicant's plant in an environmental impact statement or related supplement or in an environmental assessment, a consideration of alternatives to mitigate severe accidents must be provided.

(M) [Reserved]

(iii) The report must contain a consideration of alternatives for reducing adverse impacts, as required by § 51.45(c), for all Category 2 license renewal issues in Appendix B to subpart A of this part. No such consideration is required for Category 1 issues in Appendix B to subpart A of this part.

(iv) The environmental report must contain any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware.

(d) Postoperating license stage. Each applicant for a license amendment authorizing decommissioning activities for a production or utilization facility either for unrestricted use or based on continuing use restrictions applicable to the site; and each applicant for a license amendment approving a license termination plan or decommissioning plan under § 50.82 of this chapter either for unrestricted use or based on continuing use restrictions applicable to the site; and each applicant for a license or license amendment to store spent fuel at a nuclear power reactor after expiration of the operating license for the nuclear power reactor shall submit with its application a separate document, entitled "Supplement to Applicant's Environmental Report -- Post Operating License Stage," which will update "Applicant's Environmental Report -- Operating License Stage," as appropriate, to reflect any new information or significant environmental change associated with the applicant's proposed decommissioning activities or with the applicant's proposed activities with respect to the planned storage of spent fuel. Unless otherwise required by the Commission, in accordance with the generic determination in § 51.23(a) and the provisions in § 51.23(b), the applicant shall only address the environmental impact of spent fuel storage for the term of the license applied for. The "Supplement to Applicant's Environmental Report -- Post Operating License Stage" may incorporate by reference any information contained in "Applicants Environmental Report -- Construction Permit Stage."

10 CFR 51.95

§ 51.95 Postconstruction environmental impact statements.

(a) General. Any supplement to a final environmental impact statement or any environmental assessment prepared under the provisions of this section may incorporate by reference any information contained in a final environmental document previously prepared by the NRC staff that relates to the same production or utilization facility. Documents that may be referenced include, but are not limited to, the final environmental impact statement; supplements to the final environmental impact statement, including supplements prepared at the operating license stage; NRC staff-prepared final generic environmental impact statements; environmental assessments and records of decisions prepared in connection with the construction permit, the operating license, the early site permit, or the combined license and any license amendment for that facility. A supplement to a final environmental impact statement will include a request for comments as provided in § 51.73.

(b) Initial operating license stage. In connection with the issuance of an operating license for a production or utilization facility, the NRC staff will prepare a supplement to the final environmental impact statement on the construction permit for that facility, which will update the prior environmental review. The supplement will only cover matters that differ from the final environmental impact statement or that reflect significant new information concerning matters discussed in the final environmental impact statement. Unless otherwise determined by the Commission, a supplement on the operation of a nuclear power plant will not include a discussion of need for power, or of alternative energy sources, or of alternative sites, or of any aspect of the storage of spent fuel for the nuclear power plant within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b), and will only be prepared in connection with the first licensing action authorizing full-power operation.

(c) Operating license renewal stage. In connection with the renewal of an operating license or combined license for a nuclear power plant under parts 52 or 54 of this chapter, the Commission shall prepare an environmental impact statement, which is a supplement to the Commission's NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (May 1996), which is available in the NRC Public Document Room, 11555 Rockville Pike, Rockville, Maryland.

(1) The supplemental environmental impact statement for the operating license renewal stage shall address those issues as required by § 51.71. In addition, the NRC staff must comply with *40 CFR 1506.6(b)(3)* in conducting the additional scoping process as required by § 51.71(a).

(2) The supplemental environmental impact statement for license renewal is not required to include discussion of need for power or the economic costs and economic benefits of the proposed action or of alternatives to the proposed action except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. In addition, the supplemental environmental impact statement prepared at the license renewal stage need not discuss other issues not related to the environmental effects of the proposed action and the alternatives, or any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) and in accordance with §

51.23(b). The analysis of alternatives in the supplemental environmental impact statement should be limited to the environmental impacts of such alternatives and should otherwise be prepared in accordance with § 51.71 and Appendix A to subpart A of this part.

(3) The supplemental environmental impact statement shall be issued as a final impact statement in accordance with §§ 51.91 and 51.93 after considering any significant new information relevant to the proposed action contained in the supplement or incorporated by reference.

(4) The supplemental environmental impact statement must contain the NRC staff's recommendation regarding the environmental acceptability of the license renewal action. In order to make its recommendation and final conclusion on the proposed action, the NRC staff, adjudicatory officers, and Commission shall integrate the conclusions, as amplified by the supporting information in the generic environmental impact statement for issues designated Category 1 (with the exception of offsite radiological impacts for collective effects and the disposal of spent fuel and high level waste) or resolved Category 2, information developed for those open Category 2 issues applicable to the plant in accordance with § 51.53(c)(3)(ii), and any significant new information. Given this information, the NRC staff, adjudicatory officers, and Commission shall determine whether or not the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

(d) Postoperating license stage. In connection with the amendment of an operating or combined license authorizing decommissioning activities at a production or utilization facility covered by § 51.20, either for unrestricted use or based on continuing use restrictions applicable to the site, or with the issuance, amendment or renewal of a license to store spent fuel at a nuclear power reactor after expiration of the operating or combined license for the nuclear power reactor, the NRC staff will prepare a supplemental environmental impact statement for the post operating or post combined license stage or an environmental assessment, as appropriate, which will update the prior environmental documentation prepared by the NRC for compliance with NEPA under the provisions of this part. The supplement or assessment may incorporate by reference any information contained in the final environmental impact statement--for the operating or combined license stage, as appropriate, or in the records of decision prepared in connection with the early site permit, construction permit, operating license, or combined license for that facility. The supplement will include a request for comments as provided in § 51.73. Unless otherwise required by the Commission in accordance with the generic determination in § 51.23(a) and the provisions of § 51.23(b), a supplemental environmental impact statement for the postoperating or post combined license stage or an environmental assessment, as appropriate, will address the environmental impacts of spent fuel storage only for the term of the license, license amendment or license renewal applied for.

AFFIDAVIT OF SERVICE

STATE OF NEW YORK)
 : ss.:
COUNTY OF NEW YORK)

OREN ZEVE, being duly sworn, deposes and says:

- (1) I am over eighteen years of age and an employee in the office of Andrew M. Cuomo, Attorney General of the State of New York, attorney for petitioner State of New York, in 08-3903-ag(L).
- (2) On the 5th day of May, 2009, I served the attached Brief in the following manner:
 - (i) two copies by overnight service; and
 - (ii) one PDF copy via electronic mail.
- (3) On the 5th day of May, 2009, I served the Joint Appendix in the following manner:
 - (i) one paper copy and one PDF copy by overnight service.
- (3) I served the above-referenced document upon the following named persons:

James Adler
 Office of General Counsel
 U.S. Nuclear Regulatory Commission
 OWFN, Mailstop 15D21
 11555 Rockville Pike
 Rockville, MD 20852-2738
 James.Adler@nrc.gov

John E. Arbab
 Environmental & Natural Resources
 Division, Appellate Section
 U.S. Department of Justice
 United States of America
 Patrick Henry Building, Room 2121
 601 D Street, NW
 Washington, DC 20004
 John.Arbab@usdoj.gov

Catherine Stetson
 Hogan & Hartson LLP
 Columbia Quare
 555 13th Street, NW
 Washington, DC 20004
 CESTetson@hhlaw.com

 OREN ZEVE

Sworn to before me this
 5th day of May, 2009

 Assistant Solicitor General

ANTI-VIRUS CERTIFICATION FORM

See Second Circuit Interim Local Rule 25(a)6.

CASE NAME: State v. US NRC

DOCKET NUMBER: 08-3903-ag(L)

I, (please print your name) Oren Zeve, certify that

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Date: 05/05/2009